CHEMICAL MARKETS

VOLUME XXIV ESTABLISHED 1914 NUMBER 5

Contents for May, 1929

CHEMICAL MARKETS, INC., Publishers

Publication Office, 28 Renne Ave., Pittsfield, Mass. Editorial and General Office, 25 Spruce St. New York City

WILLIAMS HAYNES, PRESIDENT; ROBERT STRANGE, SECRETARY; D. O. HAYNES, JR., TREASURER

PUBLISHED ON THE TENTH DAY OF EACH MONTH AT PITTSFIELD, MASS. SUBSCRIPTION TWO DOLLARS A YEAR, IN ADVANCE, POSTPAID TO ALL COUNTRIES; SINGLE COPIES, CURRENT ISSUE, 25 CENTS; BACK COPIES, 50 CENTS EACH. NOTICE OF THREE WEEKS IS NECESSARY TO CHANGE SUBSCRIBER'S ADDRESS AND IN WRITING PLEASE GIVE BOTH THE OLD AND NEW ADDRESSES. PRINTED FOR THE PUBLISHERS BY THE SUN PRINTING COMPANY, PITTSFIELD, MASS. ENTERED AS SECOND CLASS MATTER, JANUARY 1, 1928 AT THE POST OFFICE AT PITTSFIELD, MASS., UNDER THE ACT OF MARCH 3, 1879.

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Rock or Sand?

IN his discussion of farm waste utilization Major Walker has reiterated three simple economic principles, fundamental to the successful commercial life of any embryonic chemical enterprise. He has stated these facts so plainly and forcefully that by all the emphasis of quotation we want to do our bit in so impressing them upon every technical and operating man, upon every administrative and financial executive in whatsoever way connected with chemical industries, that they will not again forget these easily overlooked truths.

"The manufacturer must purchase his raw materials at a price that permits a fair manufacturing profit and he must be assured of a certain and regular supply in quantities sufficient to meet his operating requirements."

"It is ridiculous to manufacture any product, however cheaply it can be produced, unless there is a demand for it, or unless a demand for it can be economically created."

"After a new product has been successfully and economically manufactured, it must of necessity compete with, and in many instances replace, existing materials before it can become a financial success."

ANY comment seems superfluous. But let us summarize in order to re-emphasize these economic axioms. No chemical process, however successful it may be from a technical point of view or no matter what savings it effects in operations, can be operated commercially unless raw materials may be certainly obtained in sufficient quantities, at the point of manufacture, at a low cost and unless the product to be produced is marketable in direct competition with similar products produced elsewhere by the same or by different methods.

THROUGHOUT the editorial rooms of one of the great newspapers there hang on every wall neat signs that proclaim three words — "Accuracy—Speed—Accuracy." In the laboratory, in the works office, in the board room of every big chemical company a paraphrase of that warning and inspiration might very aptly display to constant gaze: "Raw Materials — Markets — Competition." Any proposal that could not satisfactorily meet these three requirements might quite safely be condemned as unsound. The savings that such a negative rule would effect would be very considerable, while on the positive side, the extra profits that would accrue, if only projects found to square with these economic fundamentals were undertaken, would be colossal.

"Swat the Fly"

One hundred and thirty millions of dollars is, in the parlance of the street, a "pot of money" and it is natural that with such a sum involved a swarm of flies should gather about the mess which the Government has succeeded in making out of the disposition of Muscle Shoals. Some of these are merely troublesome species who by distracting the attention of Congress make a sensible settlement the more difficult. Others are silly and so greedy that their proposals are openly preposterous. A few are positively noxious. Even these last would not be dangerous, if the Muscles Shoals problem were to be solved in a businesslike manner by a group of business men. Because this gigantic nitrate experiment is involved in politics, with all the political implications of party patronage, jingoism, and buncombe, it is quite necessary to keep the flies away from this honey-pot.

Quite the most effective way of accomplishing this is to state and re-state again and again as explicitly as is possible just what the status of the Muscle Shoals enterprise is to-day.

To the Congress and to the public it should be made perfectly plain that the best expert opinion agrees that upon no basis either of sound chemistry or of sane economics is the Muscle Shoals development a fertilizer factory. The process it employs had been superceded by more efficient methods which are already in operation in the United States. Its investment is so heavy that the interest charges upon any reasonable and businesslike basis would eat up the profits even if the plant were to produce all of the nitrates consumed on American farms. Such a claim as was made by the Farmers' Federated Fertilizer Corporation last year when they promised to reduce the price of fertilizers by twenty dollars a ton at a time when a number of standard grades were actually selling to farmers at as low as eighteen dollars, serves as a flagrant example of the misuse of the fallacious fertilizer arguments so frequently in the forefront of Muscle Shoals projects.

The dangers to established and efficient private enterprises in both chemical and power fields that lurk behind any form of Government operation have been most effectively pointed out by the President. But it is by no means certain that Congress, by accepting some low bid, or by authorizing additional public expenditures, or by leasing with reduced interest charges, or by remitting taxes, will not place the plant in private hands with what virtually amounts to a subsidy. This is patently a form of unfair competition; but it is a form of business evil which is dangerously easy to cover up. Such subtleties need also to be ruthlessly laid bare.

No one seriously questions the intentions of Congress in regard to this trying problem; but the best possible solution, which will be none too good at this late date, can only be made sure by the most careful and intelligent consideration of the facts. These facts must not be obscured or distorted.

The Chemical Outposts

In its recent meeting at Washington, the Chemical Advisory Committee to the Department of Commerce adopted several resolutions which are of considerable significance as indications of the ever-increasing importance of export fields in the marketing problems of our chemical industry. The Committee first of all recommended another conference similar to those held in 1926 and again last year, in which the chemical executives might confer with the Department, and hear the views of its representatives in foreign countries with regard to conditions and markets in these countries. Last year the meeting was addressed by the Department's chemical specialists from Paris and Berlin, but for the next conference the Advisory Committee suggested that as many as ten foreign officers from the ten foreign countries most important in United States' exports, be assembled in Washington so that the chemical industry might have the benefit of their knowledge and experience in these export fields.

The Advisory Committee also endorsed a suggestion that the European foreign officers of the Department who give special attention to chemical developments meet at some convenient point to co-ordinate this phase of their work. Furthermore, it was urged that a further strengthening of the entire personnel, both at home and abroad, of the Chemical Division of the Bureau of Foreign and Domestic Commerce, be undertaken by the Department.

Nothing could bespeak more plainly the very evident admiration of the Chemical Advisory Committee for the work which the Department of Commerce and its representatives abroad have engaged in on the behalf of the industry as a whole. Nothing could emphasize more strongly the fact that it is to markets away from home that the

chemical industry must look for continued welfare and prosperity.

Heartiest congratulations are due to the Department of Commerce, and especially to the officers and personnel of the Chemical Division of the Bureau of Foreign and Domestic Commerce, upon the indispensable position they have made for themselves in the present and future activities of this industry.

Quotation Marks

In the last analysis the power of advertising depends upon the degree to which it wins the confidence of its readers. No man will buy a product on the strength of an advertisement he knows to be false; neither will the public generally pay much attention to advertising if they believe advertising generally to be given to misrepresentation. Actually, the public shows considerable discrimination in its reading of advertisements, but one deceit practised through the art hurts the pulling power of all advertising.—*Manufacturers' Record.*

Independent judgment and opinion is a glorious thing, on no account to be surrendered by any man; but when one seeks companionship on a large scale, he must be content to join with those who agree with him in most things and not hope to fine a company that will agree with him in everything.—*John W. Davis.*

No individual has the right to determine what law shall be obeyed and what law shall be enforced. If a law is wrong, its rigid enforcement is the surest guaranty of its repeal. If a law if right, its enforcement is the quickest method for compelling respect for it.—*Herbert C. Hoover.*

If no new virtue can be discovered in a product, or if the old virtues cannot be adorned in new trappings and sung to a new tune, then it is the job of those who would market it to find a new theater and an unjaded audience.—*Direct Reflections.*

I worked for Mr. Hoover in the campaign and I think he is a wonderful President, but he doesn't know as much about immigration as some of the rest of us.—*Elon Huntington Hooker.*

In our time, amid all the ill-omened striving after power and luxury, there still lives an appreciation for the eternal aims of the human spirit.—*Albert Einstein.*

One grows weary of the modern cult of success.—*Lord Birkenhead.*

In our education we are still experimenting with useless fads.—*Professor E. K. Rand.*

Given a strong co-operative movement by the united lumber, paper, and cotton textile industries for the foundation of a cellulose institute to prosecute fundamental studies and the encouragement of research in our universities, we might confidently look forward to as many developments in scientific and industrial directions from cellulose as have followed research in coal tar.—*The Paper Industry.*

There is no magic in mergers any more than there is any monopoly menace in them. There is no more reason to fear them than to believe in them. They have to take their chances and share the vicissitudes of all business enterprise.—*Virgil Jordan.*

The chemist of the future is unlikely to be a solitary worker, and his investigations will be conducted with his colleagues: the physicist, the physiologist, and the engineer.—*Sir James C. Irvine.*

People don't buy lamps; they buy light. They don't buy houses; they buy shelter. Advertising should sell the use, not the product.—*The Eaglet.*

There is nothing in all education of more intrinsic need than education in beauty.—*Robert Bridges.*

Out of our laboratories come our comforts and conveniences.—*Major Gen. George O. Squier.*

Better output generally follows higher wages.—*Gerard Swope.*

Ten Years Ago

From our issues of May, 1919

Amidst considerable excitement in chemical circles it became rather definitely known that Wall Street was working on plans for the amalgamation of the General Chemical Co.; the Barrett Co.; the Semet Solvay Co.; and the National Aniline & Chemical Co.

Eli Winkler, Eygene M. Taylor, Charles M. Butterworth, H. M. Hooker, and H. G. Carrell were elected directors of newly organized United States Alkali Export Association.

Heyden Chemical Co. is incorporated by Allan F. Ryan, with capital of $2,500,000 and common stock of the company was placed on the New York Curb Market.

National Aniline & Chemical Co. opened a branch office in Akron with H. H. Replogle in charge of sales in the Intermediates Department.

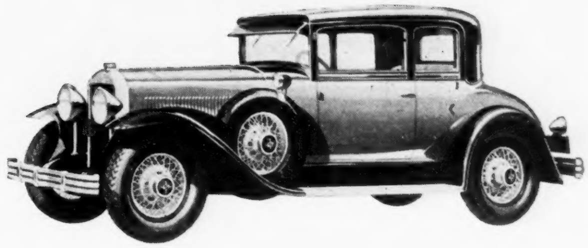
Roessler & Hasslacher Chemical Co. brought suit in equity to prevent property passing into control of Alien Property Custodian.

Foreign trade committee of the Chemical Alliance, Inc., submitted a report recommending the organization of a $15,000, 000 chemical export corporation under the Webb-Pomerene Law.

American Potash Co. was incorporated in Delaware with capital of $4,000,000.

Hird Process for distillation of tar was put into commercial operation in England.

The continued rapid growth of the automobile industry has made it one of the outstanding users of chemicals. Herein is contained a translation of the car in terms of chemicals, the visualization of which brings with it a new realization of the importance of chemicals in auto production.



CHEMICALS *and the* CAR

By L. B. Case

General Motors Corporation

If a genie out of the Arabian nights were to utter his magic formula over an automobile to reduce it to its original state, the result would be first a pile of assorted parts and finally a mass of ore and sundry chemical compounds. A wide variety of materials are used in producing automobiles and in the list are more than one hundred of the substances commonly included in chemical price lists. Many of these substances become a part of the machines and are delivered to the customers. Others are used in the processes of fabrication, either by the automobile manufacturers or by concerns supplying semi-finished materials. In this latter class are included fuels, refractories, lubricants, lacquer thinners, tool steels, carburizing compounds, and platers supplies.

Specifications issued by the Society of Automotive Engineers, list sixty-six compositions of steel for use in automobiles. An "active" list of automobile steels would include about 30 compositions. All steels contain iron, carbon, manganese, phosphorus, sulfur, and silicon. Steels containing an important amount of elements other than those listed above are known as "alloy" steels. Several alloying elements are used: manganese (in excess of that permitted in carbon steels); nickel; chromium and nickel; chromium and molybdenum; chromium, nickel, and molybenum; chromium; chromium and vanadium; silicon and manganese; etc. A low percentage of carbon is used (with a few exceptions) in parts made by cold forming operations on sheet or strip steels. This class of parts includes fenders, radiator shells, splash aprons, wheel felloes, tire rims, brake drums, running board brackets, oil pans, gasoline tanks, etc.

The manufacture of the sheet steel used for fenders, radiator shells, etc. involves an extensive pickling operation using sulfuric acid and perhaps an "inhibitor". Inhibitors retard the action of the acid on the bare metal but not on the scale, or perhaps the metal in immediate contact with the scale, and thus produce a smoother product. The excess of acid is neutralized with lime. Radiator shells are found in dies lubricated with a variety of oils or proprietary "drawing compounds." The polishing and buffing operations involve the use of glue, petrolatum, tallow, fatty acids, and a variety of abrasives. The plating operation requires alkaline cleaners, copper anodes, copper cyanide, sodium cyanide, nickel anodes, nickel sulfate, and chromic acid. The general practice of chrome plating automobile lamps, bumpers, radiator shells, and hardware during the past few years has had a marked effect on both the quality and price of chromic acid.

Camshafts, cam followers, spiral beveled ring gears, pinions, piston pins, and numerous other parts must have hard surfaces in order to resist wear. In many instances a tough inside or "core" is desirable. In many instances it is expedient to forge and machine these parts from steels which are not originally capable of acquiring any considerable degree of hardness. Low-carbon "plain steel" is ordinarily used for camshafts. The material is forged and rough-machined. It is then copper plated in a solution containing copper cyanide and sodium cyanide. Another machining operation removes the copper from the surfaces to be hardened. The shaft is then packed in carburizing compounds and heated at approximately 1700°F for a sufficient length of time. Carbon is absorbed by the surfaces of the steel which are not covered by copper. Upon heating and cooling from proper temperatures and in the proper sequence, these surfaces acquire a great degree of hardness. The core and the places covered by copper retain their original degree of toughness and the distortion incidental to the process may be straightened by cold bending. The shafts are finished by a very precise grinding operation. In addition to the plating solution already mentioned, a number of chemicals are used. There are numerous formulae for carborizing compounds. Mixtures containing coke, charcoal, barium carbonate, calcium carbonate, and sodium carbonate have been used extensively and successfully. The machining and grinding operations are assisted by emulsions of "soluble oil." The market affords quite a variety of these "soluble" or more properly

"emulsifying" oils. Meritorious products have been made from mineral oil, rosin, oleic acid, potassium hydroxide, alcohol and water.

Chemicals are not essential to the processes of annealing, hardening, and tempering, but are sometimes used. Molten mixtures of sodium cyanide, sodium carbonate and sometimes sodium chloride are employed to bring the steel parts to the desired temperature and at the same time prevent scaling. Mixtures of this kind containing sufficient cyanide will introduce carbon into the surface of the steel. Mixtures of molten sodium or potassium nitrates and nitrates are sometimes used for tempering.

The most important, and in fact essential, use of rubber in the automotive field, is tires. Next in importance is the insulation of the electric wiring. Following these are radiator hose, window channels, axle bumpers, door bumpers, floor mats, and assorted grommets, water shields, dust excluders, etc. The purchases of the rubber industry include a long list of chemicals. It is improbable that any one special rubber has contained all of the items in the list, however, some of the formulae seem to be quite comprehensive. Barium sulfate, carbon black, iron oxide, lead sulfate, talc, whiting, zinc oxide, and numerous other powders are used as compounding ingredients or fillers. They produce desired properties and are not to be considered as adulterants. Various organic compounds accelerate the vulcanizing process to a greater or lesser extent, making it possible to control and hasten the process so as to "increase production." A technical publication dealing with such matters lists approximately fifty of these compounds, in most instances designated by fanciful names. "Anti-oxidants" are also organic substances. They prolong the usefulness of rubber articles exposed to sunlight and weather.

Sand, lime, and soda ash of a relatively high degree of purity, are the principal raw materials used in making plate glass. The process also requires vast amounts of fuels, refractories, plaster paris, and abrasives.

The more expensive open cars are upholstered with leather. The tanning of leather is an ancient art, but its modern practice involves complex chemical and bacterial processes. Chemicals may be used to preserve hides that are to be stored or shipped before tanning. Other chemicals assist in removing the hair. A variety of vegetable extracts may be used in the actual tanning process. Oils are required to produce pliability. Dyes contribute color and varnishes contribute lustre.

Closed cars are usually upholstered in cloth containing varying proportions of cotton, wool, and sometimes mohair. The more popular grades of open cars are upholstered with cloth coated with a mixture of pyroxylin, oil (usually castor oil) and pigments. This material may be embossed to resemble leather and is frequently but improperly called "artificial leather." Sodium hydroxide and chlorine are used to purify cotton which is then nitrated with nitric and sulfuric acids. A mixture of alcohol and ethyl acetate serves as a solvent for this pyroxylin and the castor oil. Ethyl acetate is made from alcohol and acetic acid. The acetic acid may have been a by-product of the lumber industry or may have been produced synthetically.

Tops of closed cars are also covered with cloth coated with pyroxylin-oil mixtures, similar to those just discussed, or with rubber. The rubber used for this purpose is specially compounded to resist exposure. Its lustre is produced by a varnish also developed specially for the purpose. Open cars with folding tops are usually covered with rubber coated material. "Sport" cars are sometimes covered with a double texture uncoated fabric usually khaki colored. These fabrics are sometimes dyed with sulfur dyes, and sometimes with vat dyes, and occasionally, if dyed in the yarn, with both. They are water proofed by a layer of soft rubber between the two layers of fabric.

Asphalts and drying oils are the essential ingredients of the black baking enamel used on fenders and splash aprons. The application of enamel involves the use of large quantities of petroleum distillate.

The first ingredient to be mentioned in connection with lacquer is cellulose-nitrate, alias nitrocellulose, alias pyroxylin, alias cotton. It is made by nitrating purified cellulose as has already been mentioned in con-

Included in Price Lists of Chemicals, etc., are the Following Materials Used in Automobile Production

Acetic acid	**Copper**	**Phenol**
Amyl alcohol	**Copper cyanide**	**Phosphoric acid**
Aluminum	**Corn oil**	**Plaster paris**
Ammonium chloride	**Cottonseed oil**	**Potassium chloride**
Amyl acetate	**Degras**	**Prussian blue**
Antimony	**Dextrin**	**Pumice stone**
Asbestine	**Dibutylphthalate**	**Rosin**
Barium carbonate	**Diphenylguanidine**	**Rotten stone**
Battery acid	**Ethyl acetate**	**Saltpetre**
Blanc fixe	**Ethyl alcohol**	**Shellac**
Bauxite	**Ethyl lactate**	**Silica**
Bone black	**Ethylene glycol**	**Soapstone**
Borax	**Fluorspar**	**Soda ash**
Boric acid	**Formaldehyde**	**Soda caustic**
Butyl acetate	**Fusel oil**	**Sodium chloride**
Butyl alcohol	**Glue**	**Sodium cyanide**
Calcium carbide	**Glycerine**	**Sodium nitrate**
Calcium carbonate	**Graphite**	**Sodium nitrite**
Calcium chloride	**Gilsonite**	**Sodium phosphate**
Carbon black	**Hydrochloric acid**	**Sodium silicate**
Carbon dioxide	**Hydrofluoric acid**	**Starch**
Carbon tetrachloride	**Lard oil**	**Sulfur**
Casein	**Lead**	**Sulfuric acid**
Castor oil	**Lead oxide**	**Tallow**
Celluloid	**Lime**	**Tin**
Cellosolve	**Linseed oil**	**Titanium pigment**
Cellosolve acetate	**Lithopone**	**Tripoli**
Charcoal	**Naphtha**	**Turpentine**
Chinawood oil	**Nickel**	**Whiting**
Chromic acid	**Nickel sulfate**	**Xylene**
China Clay	**Nitre cake**	**Zinc**
Chlorine	**Nitric acid**	**Zinc chloride**
Chrome green	**Nitrocellulose**	**Zinc cyanide**
Chrome yellow	**Paraffin**	**Zinc oxide**
Coconut oil	**Petrolatum**	

Although a group of parked cars such as this is a common enough spectacle, it is quite unlikely that many observers of such a scene wondered about the amount of sulfuric acid or soda ash which entered into the manufacture of so many cars.

nection with coated textiles. The material is treated by one of several patented procedures which make it possible to dissolve more of the nitrocellulose in a gallon of thinner without the resulting solution being too thick or viscous for use. This is one of the most important features of the process. Without it entirely too many coats and too much solvent would be required. One or more of quite a list of resins may be used. The choice is influenced by a number of factors. The resin must be compatible with the solvent and other ingredients. Ester gum and dammar are popular. Choice of pigment is governed, of course, primarily by the color desired. Zinc oxide, prussian blue, chrome green, chrome yellow, carbon black, iron oxides and certain organic reds are used frequently. Softeners and plasticizers prevent undue brittleness. Castor oil, dibutyl phthalate, and tricresyl phosfate may be mentioned in this connection although other substances are used.

The substances enumerated in the preceding paragraph, after blending, comprise the solid or non-volatile portion of the lacquer. Blending and application are effected by the use of solvents. It is customary and perhaps necessary for these solvents to be a mixture of several ingredients. Mixtures sometimes exhibit solvent powers not possessed by any ingredient singly. Evaporation should proceed in an orderly manner, not too rapidly and not too slowly. The ingredients of lacquers solvents are selected from quite a long list of volatile liquids, each having its own merits and idiosyncrasies. Many are excluded or used sparingly because of cost. The following are used extensively; ethyl alcohol, ethyl acetate, ethyl lactate, iso-propyl alcohol, iso-propyl acetate, butyl alcohol, butyl acetate, amyl alcohol, amyl acetate, toluene, and certain petroleum distillates. About twenty years ago the writer was engaged in anaylzing and studying clear lacquers then on the market. Only five items of the above list were commercially available at that time. The cellosolve products were entirely unknown and the butyl compounds were commercially available only as impurities in amyl alcohol or acetate. The synthetic production of amyl alcohol is relatively new. The quality and abundance of solvents available to-day should be the subject of a fine tribute to applied bacteriology, synthetic chemistry, and chemical engineering.

Distributor heads, distributor arms, coil housings, timing gears, and horn buttons, are made of compositions bonded with phenol condensation products, which are among the outstanding achievements of synthetic chemistry. The contact points in ignition systems and the filaments in lamps are made of ductile tungsten which also has an interesting chemical history. Tungsten is the important ingredient in the high speed tool steels which are essential to economical production.

Although primarily mechanical in its construction, the automobile of to-day, with its refinements, is to a marked degree a product dependent upon chemicals and chemical research. Many of the items mentioned in the preceding paragraphs are used in relatively small quantities, but nevertheless are important and, in several instances, essential factors in producing the automobile as we know it to-day.

China imported Tls. 2,683,361 worth of soda ash in 1927, of which Tls. 2,259,824 worth was imported from Great Britain, Tls. 271,793 from Hong Kong. Tls. 16,432 from Germany, Tls. 77,166 from Japan, Korea and Formosa. Tls. 4,448 from the United States, Tls. 52,463 from South Africa and Tls. 1,235 from other countries. In the same year the import of caustic soda from Great Britain was valued at Tls. 721,662, from Hong Kong at Tls. 98,757, from Japan, Korea and Formosa at Tls. 17078, from the United States at Tls. 40,644 and from other countries at Tls. 12,931. The total was Tls. 891,072. The Yung Li Salt Refinery, at Tangku, near Tientsin, manufactures soda ash from salt by modern methods. The output, totalling 30,000 tons a year, approaches the standard of imported soda.

Phosphate rock deposits in paying quantities are reported by the Department of Commerce to have been found in the interior of Brazil, at Ipanema, Cabreuva, and Cascaval. Plans are being made by the Government to import machinery and begin working deposits at Ipanema.

"NOW IT CAN BE TOLD"

Godfrey L. Cabot's Story
of the
Carbon Black Pioneering

As Told to Williams Haynes

Rough days in rural Western Pennsylvania in the early eighties and even rougher days as the frontier of the carbon black industry moved in among the mountaineers of West Virginia years later, are described by Mr. Cabot, in this, the third of a series of stories on early days in the chemical industry.

FROM a little snatch of soot sneaked across the cheekbones of a savage witchdoctor to a commodity of international trade vital in the manufacture of two such modern essentials as automobile tires and printing ink, that in a sentence is the commercial history of carbon black.

For the "soot" used as black pigment by primitive races since time immemorial, and the "lampblack" made by smudging oils, resins, pitch and other carbonaceous materials, and also "carbon black" produced by the direct flame of natural gas playing upon a metal surface are all chemically the same material—i. e. finely divided carbon. But they differ in the amount of grit they contain and they vary considerably in the character of their several impurities. The finest of all, in the physical sense of the fineness of its particles and the chemical sense of its freedom from impurities, is the carbon from natural gas. Wiborg, the great ink maker, has hailed it: "King of all black pigments—a unique product; of all substances in nature, or produced by man, this product is in a more finely divided state than any other; in the dry state the blackest pigment ever made so that other substances called black appear gray in comparison beside it."

Naturally enough this "king of blacks" has replaced most of its rivals wherever the exacting requirements it meets are paramount, and its price is quite low enough to enable it practically to hold the field.

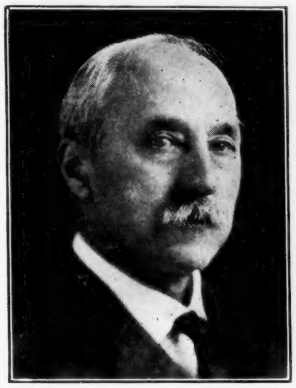
From a few pounds in 1872 to an estimated output of 300,000,000 in 1929 is the record of the rise of carbon black made from natural gas. Its industrial triumphs have come within a generation and among the leaders of the industry to-day is one who as a young man was one of the pioneers in the field. In 1882 Godfrey L. Cabot went out from Boston into the gas fields of western Pennsylvania to help build a new carbon black factory being erected by his brother.

The transition was a rather violent one for a New England youth from a cultured home, and it gave him what he himself characterizes as "my first contact with shirt-sleeves men," a contact invaluable in an industry that from its very nature must of necessity locate its plants at the source of supplies far from cities, in out-of-the-way country. To that early experience he owes what he considers one of the greatest compliments of his life, when he overheard a native of Calhoun Co., West Virginia, tell one of his comrades, "Hell, Mr. Cabot's just as common as anyone," which is coming a long way from the environment of Emerson and Lowell and the Harvard of the early eighties. It has given Mr. Cabot a wonderful advantage in dealing with well drillers, gas burners, teamsters, and all, and a positive handicap over some of his competitors when negotiating leases of gas rights from hard-shelled, suspicious mountaineers. Moreover, it may possibly account for his ability to chat cheerfully of the pioneering days with an adding machine on one side and a typewriter on the other, clicking ceaselessly. Undoubtedly it has made him a most interesting dual personality and a charming story teller.

"My brother, Samuel Cabot had made lamp black from tar oils for several years when in 1882 he decided to manufacture for himself the then new gas black which was making quite a stir because of its superior qualities. He went out to western Pennslyvania and from Titusville as headquarters investigated several gas properties. In the end he purchased the fourth sand gasser known as William P. McCue—a well two years old, 1,450 feet deep, wasting at that time four million feet of gas daily. He paid $3000 for the property, and the sellers were happier than boys with a kite. I would like to buy just such a well as that this very day, and I'd be ready to pay many times that original investment.

"We began construction of the plant at once, and I served as a sort of assistant general amanger of the operations for the handsome salary of $125 a quarter. But back in 1882 in western Pennsylvania the best board, room and meals, was $4.00 a week. The room I had wasn't luxurious; but the country fare was positively collossal. I wish to-day for the appetite of those frosty winter mornings when I used to polish off a steaming pile of great buckwheat cakes, white sugar and fresh country butter. The whole country was quite primitive, even the flourishing county seat such as Oil City boasted no paved street. The character of the countryside, however, despite the oil and gas and coal, was still predominately agricultural and the red school-house and the church were social centers. I thought it was all pretty rough pioneering till I went out into West Virginia fifteen years later into the rugged mountains with their no less rugged mountain people. When I first went into Calhoun County, there was no road fit for a wheeled vehicle and not a single plastered house in the region. Even to-day there is not a single foot of railroad in that county.

"But to come back again to Pennsylvania in '82—the average day's wage for an adult man was $1.00, and one of the nicest, mildest, little old ladies in the world upraided me most bitterly because our plant had bid up the price to $1.25 and she objected definitely and vigorously to paying out that extra quarter to her man of all work. To-day we are paying $5.00 for a shorter day, but a merciful Providence has probably spared her this shock.



Godfrey L. Cabot
President, Godfrey L. Cabot, Inc.

"At that time the whole idea of natural gas was nebulous and uncertain. The general notion was that it was to be the fuel of the future, but nobody knew how or why. Such enterprising towns as Buffalo Mills, Craigsville, and Worthington got their houses piped for gas—with 1/8 inch pipes! It sounds ludicrous now, but they worked at dangerously high pressures and had no control or regulators. In fact, my brother invented the first regulator we used and between us we worked out a mercury float valve.

"My brother's operation at Worthington did not, however, turn out very successfully. Absentee ownership and an incompetent superintendent combined to give me my opportunity, and in 1887 I bought my brother out."

Mr. Cabot became almost confidential as he told of his first business venture on his own. "It was a poor time for a start," he continued, "for a host of producers had been tempted into the business so that the price which was 35c a pound when we began in 1882 had dropped to 5c in 1888 when I struck out for myself. It could be demonstrated by simple mathematics that I must lose money since the price of the black was less than the cost of the gas it was made from. But as a matter of fact I always just managed to make a small profit. Rigid economy and improvements in production always have enabled me to come through in the face of all kinds of competition and fluctuating prices. That must always be, since it is not easy to change the output to balance with the very flexible demand. I am sure that the total sales of carbon black have never equalled half the capital invested, and sometimes I wonder why I ever went in for such a speculative and unsatisfactory business. Once in, I could not, and indeed would not, get out. It has a curious fascination all its very own.

"I don't want to tell you a history of carbon black—that has all been written, the development of the various processes and the growth of the production from about a million pounds when I started to the 300,000,000 that will be made this year—but it may be interesting to throw some sidelights on those early days of the industry. One of its chief charms for me has always been the colorful personalities with whom it has brought me in contact. Some of my workmen have been with me years—moving from plant to plant, to West Virginia and on to Texas as we have moved from gas field to gas field. Back in the early days in Pennsylvania, one of the most remarkable, most lovable, most entertaining men I ever knew was a great hulking Scotchman in charge of one of the L. Martin plants, a small operation he came out to erect for them at Foster's Mills. He claimed to be the world's ugliest male of the human species, and dear friend that he was of mine and greatly as I enjoyed and admired him, I must confess that he came dangerously close to making good his boast. He was over six feet tall, very stoop shouldered, short sighted with googley egg-eyes, perfectly enormous hands and his slippers would actually fit as overshoes over a number ten boot, while his collars were size 17. Once in Pittsburgh, so he claimed, a homely man stopped him and solemnly presented him with a beautiful pocket knife which had been in turn presented to him with instructions to pass it on to any man he met more ugly than himself. My friend always carried this knife and bewailed that he would doubtless have to have it buried with him. He was working on a salary-commission basis and during the period of depressed prices he was forced to quit. He disappeared from carbon black fields and I have long lost all track of him.

"About two years before I first went out to Calhoun County—that was in 1899—I had bought wells of 17,000,000 cubic feet daily capacity for $20,000 which shows how cheap gas property then was. It was on the Little Kanawha River, and we used to ship out by boat. Thanks to low water in summer and ice in winter, we kept only the sketchiest of schedules—I remember one year when we did not move a pound

from the first of July to the latter part of February. And now-a-days, Akron begins telegraphing short hasty messages if a shipment is three days late."

The rubber industry—so Mr. Cabot might have added if he were more interested in statistics than in men—takes about 70 per cent. of our carbon black consumption; perhaps 20 per cent. goes into printing inks; and the remaining 10 per cent. into a wide variety of miscellaneous articles ranging from paint and shoe blackings to phonograph records and carbon papers. According to Thomas D. Cabot, Mr. Godfrey Cabot's son, the world's trade in carbon black totals $15,000,000; a paltry figure now-a-days that does not, however, begin to represent the importance of this chemical commodity. For carbon black is cheap and a little of it goes a long way. A single pound of it, for example, mixed with eight gallons of oil makes sufficient ink to print 2,000 copies of a 16-page newspaper or 100 copies of an average length novel. The same quantity of carbon black added to the treadstock of an automobile tire will increase its mileage from less than 5,000 to over 15,000 miles.

These are two rather tangible contributions to our modern civilization.

The Manufacturing Chemist Who Makes The Postage Stamp Gum

Victor G. Bloede, president, Victor G. Bloede Co., Baltimore, is the man who makes the postage stamp gum for the Government and the subject of a "human interest" story in the Baltimore Sun, April 21, 1929. It tells of his early life, his entrance into the field of manufacture of aniline dyes as the American Aniline Works, and finally his settling in Baltimore in 1883 as a manufacturer of dextrin products. It tells of his wide philanthropic interests and goes on to say that, "He is a member of the British Society of Chemical Industry as well as the American Chemical Society, and is one of the charter members of the Chemists' Club of New York, the gathering place for chemists all over the country. Other organizations to which he belongs include the American Association for the Advancement of Science and the Franklin Institute of Philadelphia. "This is the man who makes the postage stamp gum for the Government. It is no ordinary business, and it has a fascination for the layman. The finished product must be wholesome enough for a baby to eat, strong enough to hold up against wear and weather, and thin to the vanishing point. The base is tapioca starch from Java. Roasted, powered, treated with chemicals, this becomes a fine cream-colored powder, and in this form it is shipped to Washington by the carload. Something like 1,000,000 pounds of this cream-colored powder is used by the Government every year."

German potash sales dropped to 164,736 and 144,676 tons in January and February, 1929, respectively, according to the Department of Commerce. This compares with 202,010 and 208,400 tons in the corresponding months of 1928.

Who's Who In Chemical Industry

Ober, Gustavus, Jr., president, G. Ober & Sons Co. Born, Baltimore, Md., 1881; mar., Beatrice Barclay, 17 Feb. 1917, N. Y. C.; children, 2 sons, 1 dau.; educat., Princeton, A.B., 1903, Univ. Md. Law Schl., LL.B., 1905, post grad. wk., Hopkins Univ. Various positions with G. Ober & Sons Co. Capt. Field Artillery, serving in A. E. F., 29th Div. Former pres. of Ivy Club, Princeton and member of various social clubs, Baltimore, Md. Memb., Chem. Advisory Comm., Dept. Comm.; Natl. Fertz. Assn. (vice pres., 1920; pres., 1922-25). Address: G. Ober & Sons Co., 110 E. Lombard St., Baltimore, Md.

Sperr, Frederick William, Jr., director of research, The Koppers Company. Born, Jefferson, O., 1885; mar., Lois E. Smith, Denver, Colo., 1912; children, 1 son, 1 dau.; educat. Ohio State Univ., B.A., 1906. Westinghouse Elec. & Mfg. Co., res. chem., 1906-08; Ill. Steel Co., By-Prod. Coke Plant, chem., 1910-11; Tenn. Coal & Iron Railroad Co., By-Prod. Coke Plant, chief chem., 1911-13; Inland Steel Co., Coke & Blast Furnace Dept., chief chem., 1913-15; The Koppers Co., chief chem., 1915-25; dir. res., 1925 to date. Beal Medal Amer. Gas Assn., 1921 and 1927. Memb., Sigma Xi, Phi Beta Kappa, Amer. Gas Assn., Amer. Chem. Soc., Amer. Soc. Test. Matls., Army Ord. Assn., Amer. Inst. Chem. Engrs., Franklin Inst., Eastern States Blast Furnace & Coke Oven Assn. Clubs: Chemists' (N. Y.), Stanton Hgts. Golf, Coal Research, Keystone. Address: The Koppers Co., Mellon Institute, Pittsburgh, Pa.

Swint, Wendell R., European manager, E. I. du Pont de Nemours & Company. Born, Boston, Mass., 4 Sept. 1887; mar., Lillian H. Black, Chester, Pa., 23 Sept. 1913; children, 2 daus.; educat., Brown Univ., Ph.B., 1911. E. I. du Pont de Nemours & Co., 1911 to date. Memb., Amer. Inst. Chem. Engrs., Amer. Chem. Soc., Army Ord. Assn., Soc. Chem. Ind. (London), Beta Theta Pi. Clubs: Chem. Ind. (London), American (London), Royal Automobile (London), City Athenaeum (London). Address: E. I. du Pont de Nemours & Co., 54 New Broad St., London, E.C.2, England.

Tyler, Chaplin, chemist, Lazote, Inc. Born, Washington, D. C., 28 Mar. 1898; mar., Harriet A. Scott, Boston, Mass., 1925; children, 1; educat., Northeastern Univ., B.Ch.E., 1920; Boston Univ., B.B.A., 1922; Mass. Inst. Tech., M.S., 1923. Mass. Inst. Tech., res. asst., 1920-22; res. assoc., 1923-24; McGraw-Hill Pub. Co., "Chem. & Met. Eng.," asst. ed., 1924-27; Lazote, Inc., chem., 1927 to date. A. E. F., in France, 1917-19; Lt., Chem. War. Serv.; U. S. A. Reserves. Author: "Chemical Engineering Economics." Specialist in chem. econ. Memb., Amer. Inst. Chem. Engrs. Hobby: motoring. Address: Lazote, Inc., Wilmington, Del.

Wilson, Charles G., president, Virginia Carolina Chemical Corporation. Born, Green Co., Ohio, 29 Dec. 1868; mar., Mary E. McRoberts, Malta Bend, Mo., 31 May 1898; educat., Ohio Northern Univ., LL.B., 1895. Virginia Carolina Chemical Corp., gen. counsel, 1912; vice pres., 1914-20; pres., 1920-28. Address: Virginia Carolina Chemical Corp., 11 So. 12th St., Richmond, Va. or 120 Broadway, New York City.

Wilson, Ellery Lewis, vice president and general superintendent, Rumford Chemical Works. Born, Rumford, R. I., 1 Jan. 1882; mar., Fanny Evans Hunt, Providence, R. I., 5 Apr. 1911; children, 5 sons, 2 daus.; educat., Brown Univ., 1905. Rumford Chem. Wks., 1906 to date. Patents and development of proc. for conversion of waste calcium sulfate into plaster of paris. Memb., Amer. Inst. Chem. Engrs., Amer. Electro-chem. Soc., Amer. Chem. Soc., Providence Eng. Soc., Soc. Chem. Ind., Psi U. Hobbies: music, children. Address: Rumford Chem. Wks., Rumford, R. I.

Tenfold Increase in Ten Years in THE PHENOLIC RESINS

By L. V. Redman
Vice-President, Bakelite Corporation

WE ARE just finishing the second decade since Baekeland announced his revolutionizing inventions. The first decade, devoted in its earlier half to peace-time development, closed along with the war and its urgent demand for increased output and its crippling restrictions on raw materials. But peace, while restoring phenol to industrial use and bringing its price, along with the price of that other major raw material, formaldehyde, within reach for peace-time production, has exacted even higher standards of quality and performance. It has, on the other hand, opened fields of application hitherto only dreamed of.

It is all a part of our present-day, science-born progress and prosperity, accentuated by the extraordinary usefulness of the phenol resinoid plastics in practically all industrial fields. This, together with the advantages the molding art offers to that wealth creator, mass production, is briefly the story of the last decade's progress in the phenol resinoid industry.

The rapid development of the industry (a volume increase perhaps tenfold during the decade) has come along with radio and the automobile. The industry gave radio a material especially suited to economical production of serviceable, and presentable structural parts, by which its rapid development was greatly aided. It gave the internal combustion engine dependable insulation for its ignition system, which has been no small factor in the success of the automotive industry. Meanwhile it has contributed in many ways to industry in general, electrical, mechanical, and even chemical, and the end is not in sight.

Progress during the decade has been linked in large measure with the development of the molding art. Improvement of press and mold and better design of molded piece have cut in half the time of molding, while the multiple-cavity mold and the semi-automatic press have brought large economies of labor and investment.

New uses, improved product, and lower prices have combined to effect a tenfold increase in volume during the past ten years in this industry, which is just completing the second decade since Baekeland announced his revolutionizing inventions which gave it its birth.

On the side of chemical development have come the elimination of mold staining and the production of a molding material that may be drawn hot. Whereas formerly no little labor as well as mold wear was occasioned by the necessity of frequently polishing the mold, we have in pleasing contrast to-day molding materials which instead of staining the mold polish it and leave it brighter at the end of a year's use than at the beginning.

The development of molding materials that may be drawn hot has introduced further economies. There used to be required as many chilling presses as hot presses. Now hot presses alone are needed, which alone doubles plant capacity. Also the saving in time is considerable. The net result is that what once called for a molding cycle of nine minutes may now be done in two minutes, which means a molding plant of given size is now capable of at least four times its former output. If we add the economies introduced by the multiple mold and the semi-automatic press, we have the conditions making possible the large output and lower prices of to-day that have come along with the growing demand for molded products. Obsolescence of basic patents and lower cost of raw materials have brought further lowering of prices thereby opening up an expanding field of application.

Hand in hand with lower prices have come improvement of product and further extension of the thousand uses now long imputed to these materials. As landmarks of progress during the decade just past may be mentioned the following:

There has been developed an entire series of colors supplementing the blacks and browns that long represented the variety of color available. While much in the way of light shades is left to be supplied by present and future development, the whole solar spectrum is

represented in the colors offered the molder to-day. The development of a satisfactory asbestos-filled material for heater connectors is an accomplishment of the last two years. By this means the heat resistance of the molded piece has been raised from 250°F to 450°F.

Also during the last two years has come the development of a material giving a shock resistance ten to twelve times that of the regular molded product, itself a good shock-resisting material. This is accomplished by employing a filler of coarsely comminuted fabric, or of long fibre. From such a material are being molded saw handles, camera cases, fishing reels, airplane pulleys and an increasing number of other appliances requiring great durability.

A very recent development is that of a molding material giving much increased resistance to the carbonizing effect of the electric arc. The "Question Mark" in its recent sustained flight made use of this material, while some of the newer planes employ a full complement of the new product in their ignition systems.

With the radio and its particular requirements has come the mica-filled, "low loss" material giving a molded piece that has a very low power factor and high resistance and is therefore especially suitable for condenser ends and other insulating parts of high frequency apparatus.

Extension of Uses Involving Large Forms

The rapid extension of molded resinoid to mechanical uses involving relatively large forms represents an important step in the progress of the industry. Such are covers for ice cream dispensing cans, and arms for dental chairs; also mechanical applications involving especially severe conditions of use such as the "impeller" of a washing machine, exposed to the mild alkalinity of laundry soap solutions, and the spinning buckets used in the rayon industry, which must successfully resist an acid bath. Again, the building trades are using these products to an increasing extent for lighting fixtures, door knobs and escutcheons, and for wall switch plates in which non-corrosion and insulation are had along with economy of production. In this connection may be mentioned the all-molded, single-piece telephone, having much better acoustic properties than its European antecedent which consists largely of metal.

A very important development of the past decade is the fabric gear either cut from canvas laminated or from molded resinoid-impregnated canvas arranged to give homogeniety of structure. Such gears provide silently operating timing trains for the present-day automobile.

Satisfactory insulation of the automatic telephone has been provided by paper laminated with its resistance to the "cold flow" that caused the failure of insulation previously employed.

A notable development is that of flexible punching stock of high resinoid content having good electrical properties along with superior punching qualities, and which may be safely punched without heating.

Another rapidly developing use of laminated resinoid is as a veneer for the tops of tables, highboys and other hotel, restaurant, and store equipment. The material requires no finishing, may be produced in a wide variety of colors and designs, and is secure against the attack of alcoholic solutions and glowing cigarette butts.

An outstanding achievement of the last ten years is the grinding wheel bonded with phenol resinoid. This has come along with the demand for rapid, accurate grinding. These wheels are operated at a speed of 10,000 surface feet per minute as against half this speed for safe operation of vitreous wheels. Wheels may be produced of open structure especially suitable for snagging and cutting. They cut granite as rapidly as vitreous wheels cut marble and wear away slower in the process.

The gas-filled electric lamp required a heat-resisting bonding agent between the glass bulb and its base and found it in a phenol resinoid cement that is infusible and tenacious. Such a basing cement is also used very generally in electric lamp and radio tube manufacture.

The above are the outstanding achievements that come to mind as representing progress during the past decade in the phenol resinoid industry. It takes no account of a considerable number of new and semi-commercial developments that appear to have large industrial possibilities. These are left for the chronicler of the industry's progress ten years hence, when, from present-indications, there is likely to be vastly greater progress to record.

Fifty-three sulfuric acid factories were operating in Japan during 1927, according to figures in the "Journal of the Society of Chemical Industry of Japan." Expressed as plant units there were 117 working on the chamber process and 10 on the contact process. The total capacity of production (in terms of 50° Be acid) of the industry in 1927 was 1,480,000 tons, whilst consumption of the acid in Japan during the year was 1,150,000 tons, of which 50 per cent. was used in superphosphate manufacture and 24 per cent. in the production of ammonium sulphate. The 100-ton per day unit is the one now mainly used on the chamber system. Modern intensive methods have been introduced in a number of cases, but the results are not yet absolutely satisfactory.

Fifty thousand tons of fixed nitrogen from coke-oven gases will be produced in Germany during 1929, according to preliminary estimates from that country. The new concerns are confident that, by the recovery of all the potential hydrogen in the Ruhr coke-oven gases, it will be possible to produce 2,000,000 tons of synthetic nitrogen annually. The first plant, to be erected by the Ruhr Chemical Co. at Sterkrade, will be in operation within a month. This plant will employ the Casale direct ammonia synthesis with waste coke-ovens hydrogen and an output of 20,000 tons annually is predicted.

Germany's exports of ammonium chloride during 1928 (35,580 metric tons) were nearly forty per cent. greater than in 1927, according to the Department of Commerce. Largest markets for this trade were Belgium (10,012 metric tons), France (9,996), Netherlands (3,689), and United States (3,509).

The FARM *As A Producer of* CHEMICAL RAW MATERIALS

By Major T. P. Walker*

Vice-President, Commercial Solvents Corp.

SINCE the World War, the resultant chemical awakening of America, coupled with the economic depression of our agricultural interests, has contributed to the general idea that the chemist is a modern Aladdin, who can become the savior of agriculture, and that if he is but furnished with sufficient financial support, the question of farm relief and the utilization of agricultural principal and waste products can be speedily solved. In all of this discussion and wide newspaper publicity, no few have neglected the fact painfully learned over and over by many guileless investors—that the chemist can but point out the way and unless this way is governed by laws of sound economics, as well as sound chemistry, the result can be but a failure.

Chemical processes even if successfully worked out in the chemical laboratory, cannot be operated successfully industrially unless uses may be found for the products obtained, unless these products can successfully compete with similar materials produced elsewhere, and unless also the raw materials from which they are obtained may be secured in sufficient quantities, at strategic points, at low enough cost. These factors are entirely economic ones and unless they are in agreement, few, if any, chemical processes can become commercial successes regardless of what their prospects may be in the laboratory. Claims too broad or promises too optimistic hurt rather than help, and for this reason we who are working for the best interests of both agriculture and chemistry should strive to obtain a rational picture of the relationship between the two and not close our eyes to the facts or expect that the chemist will be the Messiah come to save the farmer.

Now for a brief survey of those chemical raw materials which agriculture is contributing, nearly all of which are selected for their content of carbohydrate, cellulose, or oil. It is to be noted that they are almost equally divided among primary products and waste products. The former are produced as a source of food or covering for man or beast and consequently the amounts available in excess of such demands vary considerably from year to year with supply and demand, with the result that there is a constantly fluctuating price factor. This is a great disadvantage to any industry depending upon a more or less unstable raw material cost, as strikingly illustrated in the rubber industry. Hardly any other industry outside of agriculture has as many adverse factors to deal with as the chemical industry which employs farm raw materials.

Those chemical activities which depend upon waste by-products for their raw material, find these conditions true to a somewhat less extent. This certainly holds until the utilization of waste materials has been so well developed that no surplus remains, at which point, of course, the same factors then enter into the picture as play a part with primary materials. The employment of these waste by-products has important drawbacks which, in some cases, overbalance their apparent advantages. At this point the economist must come to the assistance of the chemist.

The relative importance of a number of manufacturing industries employing agricultural products as their raw material is indicated by the following figures for the year 1925.

Rank	*Industry*	*Value of Product*
1	Textiles and their products	$9,122,857,550
8	Cane-sugar refining	606,632,783
16	Cottonseed oil, meal and cake	295,684,529
21	Linseed oil, meal and cake	140,513,542
22	Sugar beet, production and sugar refining	132,339,012
29	Rayon	88,060,962
32	Ethyl alcohol	57,705,704

A comparison of these figures with the total estimated income of the United States for the year 1923,

*Abstracted from paper presented April 30, at meeting of American Chemical Society, Columbus, Ohio.

which amounted to nearly 70 billions of dollars, appears small. Of this total, manufacturing interests contributed approximately 34 per cent. agriculture 13.5 per cent. About 6½ billion of the total United States income was obtained from chemical and allied products. This total, however, does not take into consideration certain other branches of industry such as rubber, paper, textiles, food and allied products, where chemical processes and materials play a major part. Of the 9.4 billions of income produced on the farm, the major portion is consumed on the farm and never reaches the market in a form suitable for use as chemical raw materials.

Of actual and potential raw materials produced on the American farm, our two major crops are of prime importance—corn and cotton. The Corn Belt States produce annually 2¾ to 3 billion bushels of corn. Of this vast quantity but 10 per cent. reaches primary markets and two per cent. is exported and it is this 10 per cent. which largely determines the price.

The U. S. Bureau of Agricultural Economics has compiled the following list showing more than 50 chemical products derived from King Corn:

- Corn Kernel
  - Germ........
    - Corn oil.......
      - Table oil
      - Dyers oil
      - Soap
      - Glycerine
      - Rubber substitute
    - Oil cake....... Fertilizer
    - Oil meal....... Cattle food
  - Body or endosperm...
    - Starch.........
      - Table starch
      - Ethyl alcohol
      - Butly alcohol
      - Acetone
    - Hydrolyzed....
      - Dextrose
      - Glucose
      - Maltose
      - Corn syrup
      - Hydrol
      - Tanner's sugar
      - Cerelose
      - White dextrin
      - British gum
      - Envelope dextrin
      - Foundry dextrin
      - Anidex
    - Gluten........
      - Vegetable glue
      - Vegetable casein
      - Gluten meal
  - Hull
    - Bran

At present eleven companies in the United States are engaged in the manufacture of corn products such as starch, corn syrup, corn sugar, corn oil, etc. About 80 to 85 million bushels, or one-third of the corn that reaches the primary market, is now used in this industry. Consumption is increasing from year to year, regardless of the price of corn. It has been estimated that a further annual consumption by this industry of some 20 million bushels would be brought about if pure corn sugar were granted the same freedom of use in food products as is now accorded cane and beet sugar.

The growth of the nitrocellulose lacquer industry, with its resultant demands for solvents, has resulted in the establishment of a corn-consuming chemical industry. The production of normal butyl alcohol, acetone, and ethyl alcohol by a fermentation process now consumes annually 8 to 10 million bushels of corn. This comparatively new industry utilizes about 25 per cent. as much corn as formerly was employed in the manufacture of spirituous liquors by the distilling industry of the United States.

Total corn consumption by our industries as a whole is between 90 and 100 million bushels annually. With continued scientific research and favorable governmental action, the next few years should see the use of corn for industrial purposes greatly increased. Chemical utilization of the corn kernel appears to be fairly well established and no startling new developments are at present in progress.

Other portions of the corn plant have long been the subject of much scientific research in an endeavor to bring about successful utilization. For every pound of corn produced by the plant there is a pound and a half of stover (stalks, leaves, husks and tassel): the total amounts of these materials reach stupendous sums. Mr. H. G. Knight, of the U. S. Bureau of Chemistry and Soils, estimates that the annual available waste agricultural products are as follows: 100,000,000 tons of corn stalks; 20,000,000 tons of corn cobs; 60,000,000 tons of cellulose straw; 3,000,000 tons of oat hulls; 1,800,000 tons of cottonseed bran; 2,200,000 tons of flax straw; 700,000 tons of peanut hulls.

Of late there has been much discussion as to the amount and dependability of our wood pulp supplies for our ever-increasing demands for paper, accompanied by a quest for substitutes or new sources of supply. There is annually left on the American farm vast quantities of material which, if properly processed, could be converted into paper pulp. The problem is such an alluring one that a great deal of money has been spent in investigating it. One has engaged in the utilization of corn stalks for the production of paper pulp. Another plant has been established in the Corn Belt for the production of wallboard from corn stalks. It is still too early to forecast the ultimate success of these two new industries. There can be little doubt that the technical problems dealing with these industries have been or may be most satisfactorily solved. But their success may not be entirely a matter of technique. It is necessary that farmer and manufacturer come to an understanding of each other's problems. The farmer cannot be expected to dispose of his waste product for nothing since it has value as feed and fertilizer. Industry as a general rule cannot compete with food demands for its raw materials. On the contrary, the farmer should not expect or be led to believe that his surplus waste products will necessarily "lift his mortgage." The manufacturer must purchase his raw material at a price permitting fair manufacturing profit. The chemist, the engineer, the economist and the farmer must work hand in hand in order to solve this problem of farm waste utilization. Mr. Rommel in his recent book entitled "Farm Products In Industry" has most happily expressed this truth when he says, "Up to the present time the wastes found on nearly every American farm are not wastes in an economic sense. . . . It would cost

more to use than to waste them. If all the straw and corn stalks which accumulate each year on the Corn Belt farms were turned into milk and meat, the country could not consume the increased output of food. That fact gives force and point to the agitation which has come about since the War for the utilization of these products in manufacturing."

The nine states of the Corn Belt yield enough stalks annually to produce 12 million tons of paper. However, it would prove neither economical nor feasible to attempt to utilize them in any but the most favorable location, due to the cost of collecting and transporting such bulky materials.

If a new product has been successfully and economically manufactured, it must of necessity compete with, and in many places replace, existing materials before it can become a financial success. This is especially true in the chemical industry where as a rule the greatest emphasis is placed on the production end of the problem.

Some years ago the new furfural industry was established and economical production secured through utilization of waste oat hulls. With this accomplishment it has been found that an even greater problem of finding suitable uses for this new material must be solved if the industry is to be further expanded.

A number of processes for chemical utilization of the corn-cob have been worked out, but to date none have reached a commercial scale. Here again the problem economically to collect and bring together bulky materials from widely scattered points may be an important reason for its lack of industrial utilization.

Not cellulose, but lignin is perhaps our greatest agricultural waste. While cellulose is one of the most useful of our raw materials, no extensive uses for lignin have yet been found. Millions of pounds of this material are discarded annually by the paper pulp industry. The discovery of practical uses for this material would go far toward solving the problem of the utilization of farm waste such as corn stalks, cobs, cotton stalks, and various cereal straws.

For the past few years cotton as a chemical raw material has been overshadowed by consideration of the corn farmer's problem. Cotton products have adapted themselves more easily to industrial utilization than corn and corn-waste products. For years the cotton plant has been one of the most important producers of material with which the chemist works.

In 1926, 5½ million tons of cottonseed were converted by chemical means from hitherto waste material into a variety of useful products. The value of the products thus salvaged totals approximately 250 millions of dollars. In the recovery of oil from waste cottonseed it was found that advantageous results could only be obtained after removing from the seed as much of the lint as possible. This short lint, once a waste itself, has become of greater and greater importance with the large scale production of cellulose lacquers and similar products. This great demand for linters has resulted in the recovery of from 50 to 250 pounds of lint per ton of seed.

The hulls, or bran, from which the lint and oil and oil cake meal have been separated have little value as feed but are used extensively by cattle raisers as roughage when there is a shortage of feed. This causes cottonseed bran to fluctuate widely in price, making it of little value as a raw material to the chemical manufacturer. During recent years it has varied in price in a single season from $2 to $20 a ton. Were it not for this fact, cottonseed bran could be used in most processes where cellulosic materials are employed. If all of the cottonseed hulls in the United States were treated by the same process as at present being tried with corn stalks, not less than 250,000 tons of chemical cotton could be recovered annually. There would be less difficulty and expense in collecting cottonseed bran than corn stalks since the former is already available in large quantities at centrally located oil mill centers. It could be used as a source of raw material for the production of xylose or furfural or for use in cellulose fermentation processes.

The following chart by Dr. G. S. Meloy of the U. S. Department of Agriculture indicates the various chemical uses of cotton products:

- Cotton Plant
  - Cotton
    - Bleaching
    - Dyeing
    - Printing
    - Waterproofing
    - Mercerization
  - Seed
    - Oil
      - Refined oils
      - Medical excipient
      - Synthetic stearin
      - Soap and soap powders
      - Glycerine
      - Nitroglycerine
      - Roofing paint
    - Cake
    - Linters
      - Writing paper
      - Nitrocellulose
      - Smokeless powder
      - Gun cotton
      - Lacquers
      - Artificial leather
      - Celluloid
      - Collodion
      - Rayon
      - Photographic films
      - Sausage casings
      - Pyralin toilet ware
    - Hulls
      - Furfural
      - Carbohydrates
      - Potash

Various industries of constantly increasing magnitude are basically dependent upon the products which the chemist produces from cotton. The rayon and nitrocellulose lacquer industries both contain a modification of cotton or cellulose as their basic constituent. Likewise, the photographic industry, to a large extent, and the motion picture industry, almost wholly, owe their development to nitrocellulose. The pyroxylin plastics industries alone consume annually about 10 million pounds of cotton, 25 million pounds of acids, and 10 million pounds of alcohol and camphor.

As in the case of corn, so it is with wheat—for every pound of wheat harvested there may be as much as two pounds of straw obtained as a by-product which has a small value to the farmer for feeding and other purposes on the farm. The general commercial use

of this material at the present time is in the paper industry where 42 plants located in the United States employ annually between 250 and 350 thousand tons of straw in the manufacture of paper and strawboard. The problems of collecting cereal straws are not so great as in the case with corn and cotton wastes since they are usually left in huge piles at the conclusion of threshing operations. A prominent Indiana manufacturer recently told me that his average cost of straw delivered at his mill during the current year was $9 per ton. Straw is not more generally used as paper-making raw material because the operation is more expensive than utilizing wood pulp. The chemicals are costly and difficult to recover. To-day even in the strawboard industry the tendency to discontinue the use of straw is pronounced and waste paper has in some instance entirely displaced it.

With the exception of paper and boxboard industries, the largest single chemical use of cereal waste products is in the production of furfural. A large Midwestern concern manufacturing oat products produces some 300 tons of oat hulls daily. Increasing amounts of this waste material are continually being converted into furfural just as fast as new and more extensive uses can be found.

The sugar industry utilizes the services of the chemist extensively, both in the production and refining of sugar and in the utilization of its waste products. He has been largely responsible for the present state of development of both the cane and beet sugar industries. However, from the standpoint of the industrialist, the achievements of the chemist in the utilization of waste materials of this industry are of outstanding importance. At the present time a number of chemical industries are almost solely dependent upon the waste products of sugar, the outstanding one being the production of ethyl alcohol from blackstrap molasses. Molasses consumption in the United States has increased from 89 million gallons in 1922 to 260 million gallons in 1926. Molasses is also largely used as a raw material for the production of yeasts and other fermentation processes requiring a cheap source of carbohydrates. The rapid growth of molasses consumption indicates the probability that the demand may outstrip the supply. Consequently there has been a marked interest in developing other sources of cheap carbohydrates.

In the manufacture of cane sugar, the cane is passed through heavy rollers which squeeze out a large portion of the sugar-containing juices, leaving a cellulosic pulp known as "bagasse." During the course of the milling season immense quantities of this material accumulate around the various mills making its disposal a serious problem. About seven years ago a Louisiana plant began the manufacture of insulating board from dried bagasse. The production of "Celotex," as this material is known, has increased from a little more than 18 million square feet in 1922 to about 200 million square feet in 1926. The cane fields of Louisiana alone annually produce 200,000 tons of bagasse or sufficient to produce 600 million square feet of Celotex. It has been estimated that there is enough bagasse in the world to make 9,000 million square feet of Celotex a year.

Aside from field crops there is one other large agricultural interest which is a source of chemical raw materials. I refer to the dairy interests. It has been estimated that the dairy farmers of the United States produce annually 79 billion pounds of milk. Of this total, 22½ billion pounds is processed by the country's creameries for the removal of its fat content. Until comparatively recent years these interests gave no consideration to the other milk constituents which have, when properly treated, a distinct commercial utilization and value. Of the 22½ billion pounds of milk from which the fat has been removed, there is made available large quantities of casein and milk sugar. These two materials are present in milk in approximately three per cent. of casein and 4.9 per cent. of milk sugar. One hundred and thirty plants, located principally in New York, Wisconsin, California, and Vermont, are producing annually some 26 million pounds of casein. The largest industrial consumer of casein is the paper manufacturer who uses it as a coating material. In addition to this primary use it also finds employment in the manufacture of glue, insecticides, as an adhesive for making wooden airplane propellers, and in the manufacture of wall paper. A special grade is converted into galalith and aladdinite from which a wide variety of articles such as combs, brush backs, umbrella handles, buttons, etc., are manufactured. A somewhat lesser important byproduct from the dairy is lactic acid which may be produced from skimmed or buttermilk. It is finding a place for itself in the leather and textile industries and is reported to be replacing more expensive citric and tartaric acids used in the compounding of soft drinks. Undoubtedly with the continuance of the progress being made in the industrialization of the dairy farm and creamery, these vast quantities of heretofore waste materials will be utilized to supply industrial requirements.

Oil Producing Plants

In the enumeration of the principal crops and waste farm products that go to make up the bulk of materials supplied by agriculture for our chemical industry, mention should be made of the oil-producing plants such as the castor bean, the soy-bean, the flaxseed, and the peanut. The uses to which these vegetable oils are put are many and varied, ranging from salad dressing to patent leather lacquers, rubber substitutes, soaps, and lubricants for high speed motors.

One further illustration of the practical utilization of the chemist in the solving of an agricultural waste product is to be shown in the comparatively recent production of citric acid. Figures for 1928 indicate that some nine million pounds have been produced in this country in part through the utilization of waste citric grove products and the balance by the treat-

ment of other farm products by a fermentation process. One co-operative society of citrus growers in Southern California was faced with the problem of the disposal of some 75 thousand tons annually of inferior and poor quality lemons. These lemons were grown at an approximate cost of $35 a ton and this production cost had to be taken up and apportioned to the salable part of their crop. As a result of applied chemistry these waste lemons are being converted into approximately 3,000,000 pounds of citric acid, resulting in a salvage of from $8 to $12 a ton on their rejected lemons. One other large California fruit packer has begun to turn his immense piles of fruit pits into money, producing from them a good quality of charcoal.

Concise differentiation as to what should be regarded as a farm product and what should not is extremely difficult. For instance, forestry products might be properly classed as farm products since in some sections of the country large pulp mills are actually conserving their own timber and buying from farmers by the ton or by the cord. In the South especially where the quick growing pine is found this appears to be one of the important potential future sources of cellulosic materials. Should the Claessen or Bergius processes for the production of fermentable sugars from wood prove successful, forestry products would undoubtedly assume much greater importance as a raw material for the chemist. Rubber also may become a so-called farm product as extensive experimentations on the production of rubber from the guayule plant are now being conducted in the states of the Southwest.

In conclusion, permit me again to emphasize the importance of keeping clearly before us sound business and sound economics, as well as sound applied chemistry, in the solution of the problem of the chemical utilization of all farm products. Extreme care should be exercised by all in the choice, availability, and probable cost of raw materials. Unless this be done, there may be a sad awakening. The organic chemist is daily working his modern miracles of synthesizing new products from old, and old products in new ways. Some agricultural products have already been supplanted by synthetically produced ones and we now have synthetic vanillin, synthetic camphor, synthetic indigo, and synthetic quinine.

The history of every successful chemical enterprise discloses the fact that its development from the laboratory stage to profitable large scale commercial operation has been accomplished not over night but through years of painstaking attention to the economic as well as to the technical problems involved. Despite wide publicity given to the work being done in research laboratories and political nostrums from time to time proposed, the truthfulness of the statement still holds that an increased utilization of farm primary and waste products will not and cannot be accomplished in any magical manner.

Science and Sales

An insecticide and fungicide is obtained from a mixture of powdered naphthalene, flowers of sulphur, barium sulfate, tar oil, copper nitrate, sodium silicate, formic acid and potassium silicate, this mixture being added to the product obtained by boiling pine sawdust with water and adding milk of lime.—*British Patent No. N300,439.*

An aqueous solution of calcium, litihium, or magnesium chloride is used as a delustering agent in the treatment of acetate rayon, after-treatment being effected with the aid of hydrochloric acid, benzoic acid, boric acid, salicylic acid or beta-naphthelene-sulphonic acid.—*British Patent No. 301,335.*

Liquors, which are used for the treatment of textiles, are enhanced in their effectiveness by the addition of glycol ethers, for example ethylene glycol monomethyl ether, which is used to effect solution of a difficult soluble dyestuff.—*British Patent No. 301,824.*

When phosphoric acid or a soluble phosphate is added to the dye bath, it becomes possible to use hard water in the preparation of the dye liquor without suffering the ususal diabilities that occur from such practice.—*British Patent No. 301,166.*

Lustrous plastic masses are made from linseed oil and tung oil by mixing them with zinc oxide and then treating the mixture with a sufficient amount of benzoic acid or cinnamic acid to combine with the zinc.—*German Patent No. 445,799.*

Metallic sodium, stannic chloride, carbon dioxide and the like find new use in the production of rubber-like hydrocarbons from the oils that are obtained from the hydrogenation of coal. *British Patent No. 298,584.*

Graphite is employed as a catalyst in the chloration of saturated hydrocarbons by the direct action of chlorine gas. Good yields are obtained. *French Patent No. 605,950.*

A new method of weighing silk consists in treating it with rubber latex to which tin oxide or zinc oxide has been added.— *U. S. Patent No. 1,684,286.*

Ethylidene dianilide is obtained from aniline and acetaldehyde and is used as an accelerator of vulcanization.—*British Patent No. 300,287.*

Sodium aluminate is used for purifying corn syrup and corn sugar liquors.— *United States Patent No. 1,692,817.*

Methylol compounds of a urea are readily soluble in the usual solvents for lacquers.— *United States Patent No. 1,699,245.*

Synthetic gums and resins are made by treating aliphatic vinyl esters with saturated aliphatic aldehydes.—*British Patent No. 280,246,*

Monoethyl ether of ethylene glycol is used as an ingredient of a composition for cleaning steel for painting.— *United States Patent No. 1,700,739.*

Industrial ALCOHOL

By A. A. Backhaus
Vice-President
U. S. Industrial Alcohol Company

Much has appeared in the technical press on the importance of the chemical-Alcohol. Some of the basic facts concerning alcohol as a chemical commodity have filtered into the daily press. Improvement has occurred in the understanding on the part of the general public of the importance of industrial alcohol. The fanatical dictum of 1920 "Industrial Alcohol be Damned—you know it is all booze," is no longer their sole refrain. The job of "Educating" the public on the subject of Industrial Alcohol has, however, only begun, most of the work remains to be done.

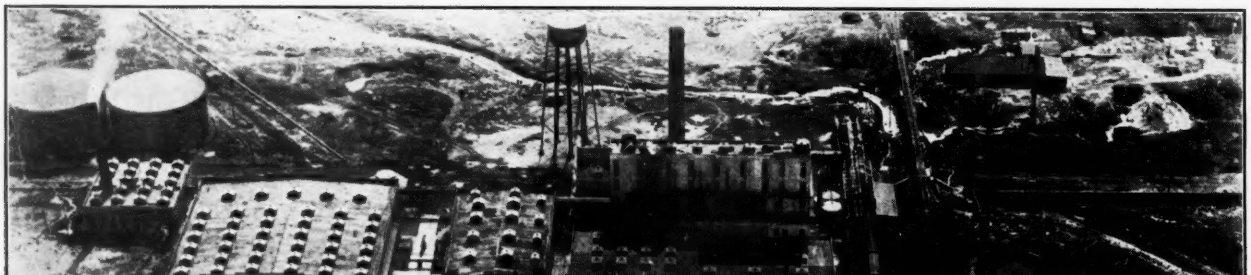
Industrial alcohol is a promising youth just arrived at voting age. Our first denatured law was passed in 1906 and became effective in 1907. Industrial alcohol was thus created. For the first time in the history of this country, alcohol could be used commercially without payment of tax.

Denatured alcohol, or better known there as methylated spirits, was legalized in England in 1855. The fifty year delay in providing tax free alcohol in this country is only another indication of the fact that the chemical industry in this country is a recent development.

The World War requirements gave chemical industry in this country a tremendous impetus. Alcohol production along with other chemicals rose very rapidly. The need for alcohol in drugs, for chemical warfare and for ether-alcohol solvent for colloiding nitrocellulose for smokeless powder, made alcohol an essential war material. Production reached an annual maximum of nearly 300,000,000 proof gallons during the war.

The enormous productive capacity for and stocks of nitrocellulose on hand at the close of the war no doubt was the most important single factor in developing the modern nitrocellulose lacquer. It forced search for a new outlet for nitrocellulose. This new lacquer industry provided at once a large outlet for alcohol and alcohol derivatives. Ethyl acetate is a lacquer solvent which is almost universally used. From no market at all before the war, the use of this alcohol derivative has grown until sales now are measured in millions of gallons annually.

The manufacture of Chardonnet artificial silk, which began in this country in 1921, is dependent upon alcohol. Alcohol-ether mixture is the solvent used for spinning. Millions of gallons of alcohol have



A recent airplane view of the Baltimore plant of the U. S. Industrial Alcohol Co. This plant is one of the largest in the world for the production of alcohol.

TABLE V

	Ethyl Alc'l withdr'n for	Denatured Alcohol Produced		
Fiscal Year	*Denaturation Proof Gals.*	*Completely Wine Gals.*	*Specially Wine Gals.*	*Total Wine Gals.*
1907	3,084,951	1,397,861	382,415	1,780,276
1908	5,640,331	1,812,122	1,509,329	3,321,452
1909	7,967,736	2,370,840	2,185,579	4,556,419
1910	10,605,871	3,076,925	3,002,103	6,079,027
1911	11,682,888	3,374,020	3,507,110	6,881,130
1912	13,955,904	4,161,269	3,933,246	8,094,515
1913	16,953,553	5,223,241	4,608,418	9,831,659
1914	17,811,078	5,213,130	5,191,846	10,404,976
1915	25,411,719	5,386,647	8,599,822	13,986,469
1916	84,532,253	7,871,953	38,807,154	46,679,106
1917	93,762,423	10,508,919	45,170,678	55,679,597
1918	90,644,722	10,328,455	39,834,561	50,163,016
1919	60,399,309	9,976,721	28,294,219	38,270,940
1920	45,640,949	13,528,403	15,307,947	28,836,350
1921	38,812,139	12,392,595	9,996,230	22,388,825
1922	59,549,920	16,193,523	17,152,224	33,345,748
1923	105,819,405	27,128,230	30,436,913	57,565,143
1924	121,576,196	34,602,004	33,085,292	67,687,296
1925	148,970,221	46,983,970	34,824,303	81,808,273
1926	191,670,107	65,881,442	39,494,444	105,375,886
1927	170,633,437	56,093,748	39,354,928	95,448,677
1928	159,689,378	46,966,601	45,451,424	92,418,026

been used in the United States in the manufacture of Chardonnet Rayon since the war.

In the field of leather coatings and of artificial leather, alcohol or its derivatives have played an important part. This again is a nitrocellulose product. The close relationship between the alcohol industry and the nitrocellulose industry is quite apparent.

Mention of leather coating and artificial leather brings to mind the automobile. The growth of automobile production since the war has been phenomenal. In the early days of open cars, artificial leather and leather coating manufacturers were wallowing in a wealth of business. Their joy was temporary. The closed car brought other materials of upholstery. Sales of alcohol for use in this field became restricted.

Automobile production, however, is still of utmost importance to the industrial alcohol manufacturer. By far the largest single outlet for industrial alcohol now is radiator anti-freeze. The increased use of anti-freeze is due first—to the greatly increased number of cars in operation and, second—to the increased "year-around" use of cars. The total cars registered each year (see Table I) is sufficient evidence on the first point, and the increasing percentage of closed cars is illuminating in considering the second point (see Table II).

Many products dependent upon ethyl alcohol have come into manufacture since the war. Ethyl acetate and Chardonnet silk have already been mentioned. Other newly commercialized products which depend upon alcohol are—lead tetra ethyl, ethyl ether of glycol, diethyl phthalate, ethyl aceto acetate, ethyl lactate, diethyl carbonate, solid alcohol (nitrocellulose base).

The manufacture of alcohol is a standardized operation. Within the past decade no significant change has occurred either in the process or in raw materials for alcohol manufacture. The use of continuous stills has increased, to meet the demand for better quality. An important post war development is the large scale production of anhydrous alcohol. The United States have the distinction of being the first to work out and put into commercial operation the continuous distillation process for the production of absolute alcohol. A laboratory reagent was transformed into a commercial product. For a number of years tank car shipment of anhydrous alcohol both pure and denatured has been common practice.

No attempt will be made to review industrial alcohol since its beginning in 1907. Industrial alcohol production has been recorded separately since May 1920. Production figures for each year beginning with fiscal year ending June 30th, 1921, given in Treasury Department reports, are shown in Table III.

Blackstrap molasses is the principal raw material, although approximately 20% of the production comes from grain. Quantity of materials used in the production of industrial alcohol as recorded in Treasury Department reports appear in Table IV.

The production of denatured alcohol, both completely and specially denatured, as well as the quantity of pure alcohol withdrawn for denaturation since the enactment of the first denatured alcohol law is shown in Table V. All specially denatured alcohol is used in the manufacture of other products. The sharp dip in the production of specially denatured alcohol in 1920, 1921 and 1922 covers the post war period of industrial depression. The possibility of

TABLE VI

	1921	*1922*	*1923*	*1924*	*1925*	*1926*	*1927*	*1928*
January	83c	36c	28c	39c	46c	38c	33c	41
February	67	29	28	39	48	25	33	41
March	67	29	28	39	48	25	29	41
April	67	24	28	39	48	24	37½	41
May	35	23	29	39	48	24	40	41
June	35	23	30	39	46	27	41	41
July	35	23	33	39	47	27	42	42
August	33	24	33	40	51	28	43	43
September	35	24	35	43	51½	31	46	44
October	33	26	37	46	51½	31	46	46
November	34	26	39	46	51½	31	46	46
December	38	28	39	46	51½	31	46	46

using specially denatured alcohol production as an index to business is pointed out. This curve appears to follow general business quite closely.

TABLE I
Total U. S. Automobile Registration

1920	7,558,848
1921	9,211,295
1922	10,448,632
1923	12,239,114
1924	15,092,177
1925	17,591,981
1926	19,954,347
1927	22,001,393
1928	23,127,315

Alcohol for anti-freeze is a seasonal business. Distribution of alcohol in this field is through jobbers and oil companies operating their own filling stations. Since this outlet consumes upwards of 40% of all industrial alcohol it dominates the alcohol market.

It is hard to sell ice skates in June, but that is what the alcohol manufacturers must do. It has been the policy in past years to give anti-freeze jobbers a price advantage of one cent per gallon for alcohol delivered in August, 2c per gallon for delivery in July and 3c per gallon for delivery prior to July. The jobber then has the burden of carrying these stocks until cold weather sets in. The price reduction is sufficient reward, because advantage is taken of it by jobbers having storage facilities.

TABLE III
Industrial Alcohol Production

1921	85,068,776	p. g.
1922	79,906,101	"
1923	122,402,849	"
1924	135,897,725	"
1925	166,165,517	"
1926	202,271,670	"
1927	184,323,016	"
1928	169,149,904	"

Table VI shows the monthly market prices on completely denatured alcohol formula No. 5, which is generally sold for anti-freeze purposes. Prior to May 1926, market quotations were in drums, since then, tank car has been basis of market quotation. A two cent per gallon differential between tank car and carload in drums has been trade practice. All the figures given in the table have been corrected to tank car base so that they will be comparable.

The business depression in 1922 resulted in the lowest prices of the past decade. A severe trade war brought prices to a runious level for a few months in 1926.

Fermentation materials account for the major part of alcohol production cost. Since molasses (largely from Cuba) is the principal raw material, the alcohol market follows molasses cost. Any tariff increase on molasses will directly effect all alcohol users. Molasses is transported in tank steamers. Industrial alcohol plants operating on cane molasses must be located on the seaboard. Inland location adds a severe freight penalty to production costs.

Prior to the war, wooden barrels constituted the customary shipping container. The alcohol was sold at a price which included the cost of the barrel. With growth of the business, returnable drums were substituted for barrels to save the customer the container cost.

In future years 1928 will be looked back upon as a milestone in the history of industrial alcohol in the U. S. Important mergers of individual companies were completed or planned.

The Industrial Alcohol Institute, Inc. whose membership includes nearly all producing companies, established the open price policy and put into effect the zone system to cover delivery freights.

The Federal Government put into effect a new production policy advocated by Commissioner Doran. Permits to use specially denatured alcohol have always been subject to a definite maximum quantity.

TABLE II
Open and Closed Car Production

Year	*Open*	*Closed*	*% Closed*
1919	1,497,000	161,000	10.3
1920	1,563,000	320,000	17.0
1921	1,179,000	335,000	22.1
1922	1,679,000	719,000	30.0
1923	2,515,000	1,246,000	34.0
1924	1,892,000	1,429,000	43.0
1925	1,696,000	2,204,000	56.5
1926	1,114,000	2,859,000	72.0
1927	564,700	2,521,000	81.7

No such limitations have in the past applied to operating permits. Production permits for 1928 were the first of this kind to be issued for a fixed maximum quantity. This policy is designed to prevent accumulation of surplus stocks and thereby avoid temptation to illegal disposition.

In the early stages of industrial development the man who could "MAKE" was in demand, later it was

TABLE IV
Materials Used in Production of Alcohol

	Molasses	*Grain*
1921	118,363,629 gal.	5,823,062 bus.
1922	96,137,913 "	7,884,494 "
1923	148,711,458 "	3,942,514 "
1924	155,001,162 "	8,677,259 "
1925	203,270,135 "	8,499,079 "
1926	267,404,218 "	8,628,515 "
1927	211,518,647 "	8,912,498 "
1928	213,629,806 "	6,704,705 "

the man who could "SELL" that commanded a premium—now the man who knows what to make is cock of the walk. The alcohol industry in considering its future might with profit realize that it is in the third stage.

Norsk Hydro-Elektrisk Kvaelstoff A/S is completing a plant at Heren, Norway, for the manufacture of a new product which is to be sold as "Kalkammonsalpeter," according to the Department of Commerce. The annual capacity of the plant is 100,000 metric tons. The new product contains 20.5 per cent. nitrogen, available in ammonia and nitrate form, as compared with 13 per cent. nitrogen in calcium nitrate.

NITROGEN

and the

Fertilizer Industry

By Charles J. Brand*

Executive Secretary, National Fertilizer Association

Aside from tracing the history of nitrogen and modern developments in nitrogen fixation, this article is chiefly important for the fact that it contains the official platform of the National Fertilizer Association with reference to that perennial subject --the disposal of Muscle Shoals. The fact that the Madden Bill is now out of committee and ready for legislative action brings the entire subject and its possible effect upon America's fertilizer industry once more into sharp relief.

NITROGEN, a colorless, tasteless, odorless gas, was discovered by Rutherford, an English chemist, in 1772. Because an atmosphere composed of nitrogen will not support life, the French named it "azote" (a, without; zoe, life); the Germans called it "Stickstoff" (a substance that chokes). Nitrogen constitutes four-fifths of our atmosphere, in which it occurs not in combination but in a balanced mixture with other gases, chiefly oxygen. It is an essential constituent of our most destructive explosives and of some of our most deadly poisons. In its many forms, simple and complex, it supplies food for plants, animals and man. Indeed the proteins, which are nitrogenous compounds, are indispensable constituents in the human diet. In chemical technology, where it is used largely in the form of nitric acid, it is employed in the manufacture of dyes, of substitutes for silk and leather, of photographic films and of many other products. It is also used in the manufacture of artificial ice and in cold storage and household refrigeration. Nitrogen is indispensable in both peace and war. In war it is a destructive, death-dealing explosive; in peace it is used constructively in mining, quarrying, clearing land for cultivation and road building. As a plant food it is of paramount value for application to soils that have had their natural fertility exhausted.

Taking the world as a whole, agriculture uses approximately 80 per cent. of all the inorganic nitrogen produced. The proportion used in our own country is smaller, because our soils have not yet been so greatly exploited as those in the older parts of the civilized world. With us only 60 per cent. of the inorganic nitrogen produced is consumed by agriculture, 40 per cent. being used in chemical industries.

From an address delivered before the Franklin Institute, Philadelphia.

Dr. J. G. Lipman, in an address delivered in 1927 before the First International Congress of Soil Science estimated the quantity of nitrogen in the soils, forests, and animal and human population of the world as follows:

Soils	40 billion tons
Forests	592 million tons
Animals	9 million tons
Human pop.	2 million tons

As most of the world's nitrogen lies near its surface, these figures might seem to indicate an adequate supply, but nitrogen is more quickly exhausted from soils, perhaps, than any other element of plant food. The peat deposits of the world contain about 3,620,000,000 tons of nitrogen, and the coal deposits contain 98,000,000,000 tons. Our truly inexhaustible supply of nitrogen is in the atmosphere. There are about 39,000 tons of nitrogen over each square acre or about 25,000,000 tons in the air over each square mile. There are four main sources of nitrogen for agriculture and industry:

Organic substances, such as cottonseed meal, packing and rendering plant tankages, dried blood, fish scrap and other organic waste materials. These have grown more and more valuable as animal feed, and hence less and less available for use in producing crops. Consequently only those of the lower grade are now available to the fertilizer industry.

Nitrate of Soda from Chile. For several decades before 1900 the largest source of nitrogen for use in agriculture and the chemical industries was the natural deposit of nitrate minerals in Chile. Nitrate was first shipped from Chile in 1830, but it was not at once used in agriculture. As a matter of fact the use of artificial fertilizers is less than a century old. It was not until 1840, that von Liebig published his pioneer work on "Organic Chemistry in its Application to Agriculture and Physiology," and the thought

of previous centuries on the use of artificial promoters of plant growth seems to have come to a focus. It was just after this time that the production of ammonia salts, including sulphate of ammonia, in great quantities as a by-product of the manufacture of gas was begun. The production of these salts has continued to grow until the present time, and they are now among the most commonly used chemical plant foods.

It was also in 1840 that the first South American guano was shipped from Peru to Europe. Its use grew rapidly, because it produced marvellous results. Its great value was due to its content of quickly available nitrogen in the form of ammonia, ranging from 5 to 14 per cent. according to the deposit from which it was obtained, and to its content of phosphoric acid, ranging from 10 to 25 per cent.

Phosphatic Developments

At this time also Sir John Lawes was developing his process of producing available phosphoric acid from natural rock phosphates by treating them with sulphuric acid. He patented his process in 1843. The first potash shaft was sunk in the Stassfurt district, in Germany, in 1851. The Germans were not seeking potash but good commercial supplies of common salt, the discovery of potash salts being purely an incidental result of their work. The systematic exploitation of the German deposits, however, was not begun until 1861.

The development of the Chilean nitrate deposits shows what may happen to an industry based upon a natural resource that constitutes a monopoly when the chemist applies himself to the problem of finding independent supplies. By 1885 75 per cent. of the total nitrate nitrogen used in the world was shipped from Chile. By 1900 this percentage had dropped to 50, and by 1925 to less than 25, which is nearly the percentage now used. The total consumption of nitrogen, however, has been increasing by leaps and bounds.

By-Product Nitrogen from the Coking Process. By converting all the forms of inorganic nitrogen used in 1883 into terms of pure nitrogen, we find that the world then used about 95,000 tons, which is the equivalent of 613,000 tons of Chilean nitrate or 457,000 tons of sulfate of ammonia, the nitrogen content of the Chilean product being 15.6 per cent., and that of sulfate of ammonia being nearly 20.8 per cent. By 1900 the world used 330,000 tons of nitrogen; by 1913, 750,000 tons; by 1923, 925,000 tons, and at present about 1,500,000 tons. By 1913 the production of sulfate of ammonia had become so great that it represented 37 per cent. of the world's consumption; by 1926, it had risen to 50 per cent., a proportion which, in consequence of the growing production of synthetic compounds, will, probably not be much exceeded in the future.

Coke and gas plants are practically the sole source of ammonium sulfate. About 90 per cent. of our coke production now comes from ovens of the modern recovery type. The process is being improved, and we are now obtaining an average of a little over 22 pounds of sulfate from each ton of coal coked in by-product ovens. Inasmuch as less than 15.5 per cent. of the coal now mined is coked before burning, an increase in the production of ammonium sulfate is probable, although the percentage of its production to that of synthetic nitrogen may remain unchanged or may even decrease, because of the more rapid increase in synthetic production.

The increase in the production of ammonium sulfate in the United States can be shown at one stroke by saying that in 1915 its total production was about 250,000 tons; whereas in 1928 it exceeded 780,000 tons. During the next ten years its production will probably be increased to more than 1,250,000 tons. This increase would be equal to 125,000 tons of pure nitrogen. Ten years ago, when the much-talked-of cyanamid nitrate plant was built at Muscle Shoals, its capacity was to be 40,000 tons of nitrogen. Since then the production of sulfate of ammonia alone has grown from 403,000 tons to 788,000 tons, the output in 1928. This means an increase from about 84,000 tons to 164,000 tons of pure nitrogen—almost double.

Synthetic Fixation of Air Nitrogen. Two decades ago a wholly negligible quantity of nitrogen was obtained from the inexhaustible resources of the atmosphere. In the year 1929 about a million tons will be obtained from the atmosphere. This figure represents pure nitrogen in terms of world production and not substances carrying nitrogen. Expressed in terms of nitrate of soda, it would be equivalent to more than six million tons.

Self-preservation, speaking euphemistically, or, to be more brutal, military preparedness, has been the motive behind the enormous increase in the fixation of air nitrogen. Every nation naturally has an ambition to be sufficient unto itself with respect to the commodities absolutely essential for its defense. The ambition for military preparedness has greatly benefited the farmers of the world, for in times of peace agriculture provides the only relatively sufficient outlet for the immense quantity of nitrogen that has been produced during the last twenty years.

Processes of Manufacture

Air-derived nitrogen is produced by three distinct processes, usually termed (1) the arc process, (2) the cyanamid process and (3) the synthetic process. The synthetic process really involves a number of different processes or variations of the same fundamental process. The essential features of these processes can be described very briefly.

The arc process, as its name indicates, involves the use of the electric arc in a manner not essentially different from that in which it is employed for street lighting. It is an imitation of the natural fixation of nitrogen by lightning.

The cyanamid process involves the fusing of coal and limestone to form calcium carbide, a compound of

calcium and carbon. This compound is heated to a high temperature (approximately 1,000 degrees Centigrade), nitrogen is passed over it in great autoclaves in the presence of steam and is fixed in the mass in the form of calcium cyanamid.

In the direct synthetic process, the one now most widely used, a mixture of nitrogen and hydrogen, which are first obtained separately, is passed under high pressure (1,500 to 15,000 pounds per square inch) over a catalyst at a high temperature (500° to 600° Centigrade) to produce ammonia gas. This gas is condensed or absorbed, as may be desired, and is marketed either in the form of ammonia (NH_3) or aqua-ammonia (NH_4), or is combined with other elements to form sulfate of ammonia, synthetic nitrate of soda or other materials.

Some of the synthetic processes now in use are the Haber, the Haber-Bosch, the Casale and the Claude. In these various processes different methods are employed to produce the pure nitrogen and the hydrogen required for the catalytic process, but the ultimate result is substantially the same.

Power Requirements

Recently Sir Alexander Gibbs, president of the Institute of Chemical Engineers of England, estimated that the arc process, which recently has been used only in Norway where hydroelectric power is very cheap, and even there its use is diminishing, demands about 80,000 kilowatt hours per ton of nitrogen fixed. Other authorities have stated that this process requires only 60,000 kilowatt hours. Gibbs states that the cyanamid process requires about one-fourth of the electrical energy of the arc process, or from 16,000 to 20,000 kilowatt hours. The direct synthetic process requires about one-sixteenth of the power required by the arc process and one-fourth of that required by the cyanamid process. It uses from 4,000 to 5,000 kilowatt hours per ton of nitrogen fixed.

These facts are worthy of careful thought in connection with the present effort to reconstruct and modernize at government expense the cyanamid plant at Muscle Shoals. Why should we undertake to put into use a plant that requires 16,000 to 20,000 kilowatt hours per ton of nitrogen if the modern process requires only 4,000 to 5,000 kilowatt hours, particularly in view of the fact that it will cost from $10,000,000 to $20,000,000 to modernize the plant ?

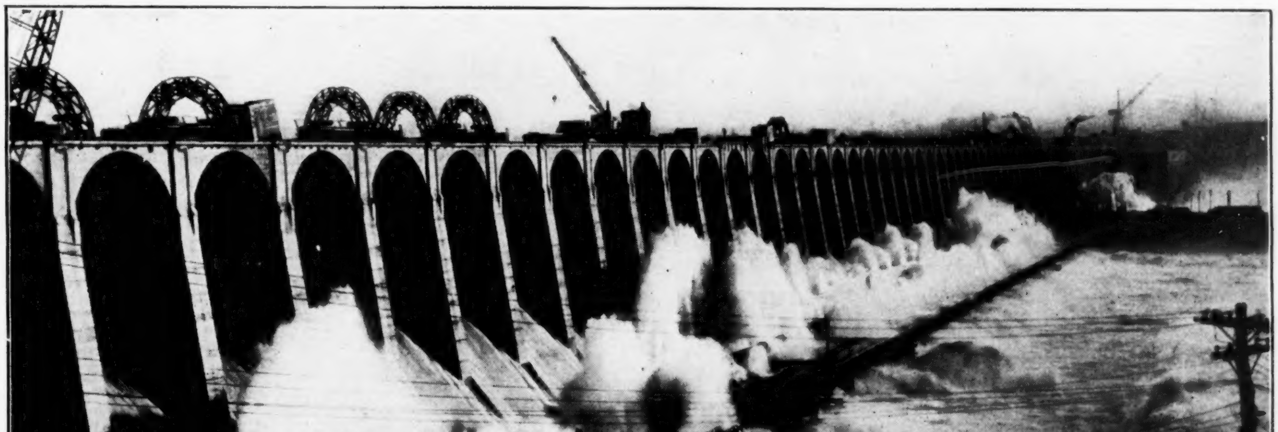
Trend of the Processes

In 1913 seven plants in the world were using the arc process and producing 19,800 tons of nitrogen. At that time this quantity represented nearly 32 per cent. of the total output of synthetic nitrogen. In 1926 the same seven plants were still producing nitrogen, but with increased capacity and greater efficiency. They were then making 40,500 tons of nitrogen, yet that quantity was only 5.5 per cent. of the total synthetic nitrogen made in the world.

In 1913 fifteen plants were producing nitrogen by the cyanamid process and their total product was 36,000 tons, or 57.4 per cent. of the world's total output of synthetic nitrogen. By 1926 the number of plants had increased to 28 (nearly double) and the production had increased to 174,000 tons, but the percentage of the total nitrogen produced by this process had dropped from 57.4 to 23.7.

In 1913 (note the contrast) only one plant was producing nitrogen by the direct synthetic process. It was making 6,000 tons of nitrogen, only about 11 per cent. of the total synthetic output, and by 1926 the number of plants producing nitrogen by this process had risen to 49, and the total production had increased from 6,000 to 519,000 tons, or 70.8 per cent. of the total synthetic nitrogen produced in the world.

The figures for 1926 are given because they are the most readily available and perhaps more authoritative than those for later years. The same trend continues, even with some accentuation, for if the market will absorb it Germany will produce this year about 600,000 tons of nitrogen by direct synthetic processes.



An unusual view of the Wilson Dam at Muscle Shoals, an all-important link in the hydroelectric power feature of the operations.

Manufacturers and others who want to get possession of the power plants at Muscle Shoals and politicians who would be benefited or think they would be benefited by the government's operation of these plants are accustomed to belittle the progress made in the United States in the fixation of atmospheric nitrogen. In 1927 we used approximately 250,000 tons of inorganic nitrogen as a source of commercial plant food. In a time of peace our industries other than agriculture use about 100,000 tons of inorganic nitrogen a year. It would therefore appear that the total nitrogen required annually in a time of peace would be about 350,000 tons. Experts on munitions estimate that the nitrogen annually needed for carrying on a first-class war would amount to about 144,000 tons.

By the end of 1929 we shall have the capacity to produce at least 100,000 tons of synthetic nitrogen. The production of sulfate of ammonia in 1928 increased nearly 10 per cent. over that in 1927. The production in 1928 was 788,000 tons. Assuming a slower rate of increase in 1929, we may expect a production of at least 850,000 tons. With a nitrogen content of 20.8, this would amount to more than 175,000 tons of pure nitrogen. Our total capacity to produce inorganic nitrogen would therefore be approximately 275,000 tons against an approximate peace-time need of 350,000. We therefore appear to be about 75,000 tons short of covering our need of inorganic nitrogen, and the demand is still increasing. Highly satisfactory progress is being made, however, and by the end of 1932 we shall probably be measurably self-sufficient. In 1913 we produced no synthetic nitrogen whatever; in 1921 we produced 200 tons; by the end of 1929 we shall have the capacity to produce about 100,000 tons. The recent and prospective increase has been due chiefly to the breaking in of the units of the great chemical plant at Hopewell, Virginia. Six or seven other corporations are increasing their production, so that by the end of 1932 we may have a synthetic production capacity of possibly 200,000 tons. In the event of war we could easily raise this total to 250,000 by modernizing the obsolete cyanamid plant at Muscle Shoals. When we make war we are not likely to consider economy of production.

To show our progress toward freedom from foreign nitrogen, I need only say that in 1900 the United States produced 13 per cent. of its requirements; in 1910, 18 per cent.; in 1913, 25 per cent.; in 1928, 50 per cent. In 1929 it is estimated that it will produce 65 per cent. of its requirements, and in 1930, 80 per cent.

Muscle Shoals and the Nitrogen Problem

No discussion of the production of nitrogen in the United States would be complete without mention of the problem of disposing of the government properties at Muscle Shoals, Alabama. During the last ten years Muscle Shoals has ranked with prohibition and farm relief in its demand for newspaper space. I have already commented on the fact that the ambition to attain military independence with respect to essential munitions of war now marks the phsycology of practically all countries. The United States has not escaped this ambition. In addition agricultural distress has stimulated the desire of farmers in all countries to obtain cheaper nitrogen, despite the fact that nitrogen is now cheaper relative to farm products than it was before the World War. Politics and propaganda of interested groups have been great breeders of distorted pictures and misleading half-truths. Great expectations have been created in the farmer's mind with a view to using his political power to get possession, in his supposed interest, of the great property at Muscle Shoals. False hopes have been raised in the farmer's mind of the benefits that may come to him from this source to relieve him of his present serious economic burdens.

The United States has almost unlimited supplies of phosfate rock for the production of phosphoric acid. Our phosfate reserve is seven to ten billion tons.

We are heavily dependent upon Germany and France for our potash salts, but we are now producing about 75,000 tons of potash (K_2O) annually, and the output can be increased, though perhaps not immediately, until it is sufficient to supply our needs. Potash deposits are being explored in Texas and New Mexico, and the greensands of New Jersey may some day, by the aid of our chemists, make us self-sufficient in potash as we are in phosphorus.

Our situation as to nitrogen has been fully disclosed in the course of this address. We come, then, to a consideration of a sensible economic disposal of the plants at Muscle Shoals, which shall take into account the rights of private enterprise that must carry on without subsidy from the government. We now have three valuable assets at Muscle Shoals:

1. The Wilson Dam, which cost approximately $47,000,000, with its fine hydroelectric power plant, with which should be considered Steam Power Plant No. 2, built for the use of the big cyanamid plant at a cost of approximately $12,000,000.

2. Nitrate Plant No. 1, which was built at a cost of $13,000,000 to utilize a modification of the synthetic process known as the Haber-Bosch but which was never run successfully because of our lack of precise knowledge of the details of operation.

3. Nitrate Plant No. 2, the cyanamid plant, with which should be included the Waco lime stone quarry, the cost of the two together, with their incidental properties, being about $68,000.

Plan Proposed in Madden Bill

The Madden bill, which was pending in Congress when it adjourned on March 4, proposes to turn over the properties described above to a private corporation

without charge for interest except on $17,000,000 of the cost of building the Wilson Dam, the sum expended after May 31, 1922. In other words, assets that cost the United States above $140,000,000 are to be leased for a period of fifty years without rental interest except on the $17,000,000 mentioned. About eighty million dollars of new money is to be expended, and the products of the expenditure are to be turned over to a private corporation at a rental of four per cent. The cost of construction immediately after the war was no doubt excessive, but property representing an eventual expenditure of more than $216,000,000 is to be turned over at an average rental that will pay only about 2½ per cent. Private enterprise is supposed to compete with the company that is to be given such largess by the government.

The unreasonableness or the impossibility of such a plan is made evident by the fact that the ordinary manufacturer of fertilizer pays from six to eight per cent. for all the money he borrows, both for fixed and operating capital. Furthermore, he must pay state, county and municipal taxes, from all of which the government's lessee is to be relieved. The private operator must also carry fire and other forms of insurance; the government will carry all the insurance on the plant leased. Furthermore, the fertilizer industry at present has a capacity to manufacture 10,000,000 tons of complete fertilizer, with a demand for only about 7,000,000.

Muscle Shoals is intrinsically a power enterprise. This fact is readily disclosed by the present plans. It is planned to provide dams, and generating facilities in addition to those already installed, for the production of approximately 1,250,000 horsepower years of power. The lessee promises, if a group of meticulous conditions are fulfilled, to produce, after a period of several years, a maximum of 50,000 tons of nitrogen. The maximum amount of power required for such a production would be 150,000 horsepower years. As more than a million horsepower above this requirement are to be produced, it is clearly evident that the purpose of those to be benefited is to obtain the possession and use of enormously valuable water-power plants rather than to manufacture cheap fertilizer. It should be said, however, in fairness to the company named in the Madden bill, that it does propose in good faith to manufacture a large quantity of fertilizer. The objection of the existing fertilizer industry, of which the company leasing the plant is a part, is that the plan will create unfair competition that is in every aspect unAmerican.

Plan Favored by the Fertilizer Industry

The fertilizer industry, through The National Fertilizer Association, has suggested what it believes to be a fair and practical plan for the disposal of the plants at Muscle Shoals. Its suggestion briefly is:

1. That the Wilson Dam and Steam Plant No. 2 shall be sold or leased for the generation of power for any purpose for which there may be an economic demand. If no satisfactory bidder is found, the Engineer Corps of the War Department shall continue to produce power as it is now doing and sell it at the switchboard to the highest responsible bidders. The average income for the last two fiscal years from the sale of power at Muscle Shoals has been approximately $1,300,000 yearly.

2. That Nitrate Plant No. 1, which is a pilot-size plant, shall be turned over to the United States Department of Agriculture for technological and chemical research in nitrogen fixation, including the production of nitrates for making fertilizers on a scale sufficient for farm demonstrations under the direction of federal and state experiment station workers, but not in quantity sufficient for commercial purposes.

3. That the obsolete cyanamid Plant No. 2 shall be kept in stand-by condition by the War Department for from one to three more years, and that it shall then be sold for scrap or otherwise, just as other surplus war materials have been sold, but that the nitric acid or oxidation part of the plant shall be retained by the War Department for such value as it may have for national defense, particularly in the manufacture of powder.

The cyanamid process, as has been shown, is wasteful of power, requiring no less than 16,000 kilowatt hours per ton of nitrogen, whereas the synthetic process requires only 4,000 to 5,000. The plant at Muscle Shoals has been built ten years, and during that time the art of nitrogen fixation has progressed with what might fairly be termed meteoric rapidity. There is a constantly growing need of power for all kinds of technological and industrial purposes in the Muscle Shoals area. It would be an economic crime to waste this valuable resource in an obsolete plant using an obsolescent process. It would cost between $10,000,000 and $20,000,000 to modernize the plant, and for that sum of money a new synthetic plant of greater capacity could be built near to coal, which is more important for nitrogen fixation than water power because it is a valuable source of the hydrogen that must be used in the more efficient catalytic synthesis.

The United States government should encourage, not throttle, private enterprise in the remarkable progress it has already made in nitrogen fixation. It should protect a service-giving industry that is indispensable to American agriculture and not threaten it with competition from a governmentally subsidized corporation drawn from its own ranks. It should encourage private endeavor in every possible manner, and should not engage in competition with its citizens except, as Lincoln said, when it is necessary to do something for the citizen which he cannot do for himself.

1928 DYE PROGRESS

Increased Production of Vat and Other Fast Dyes — Production of Many New Fast and Specialty Dyes —Reduction in Number of Producers—Increase in Unit Sale Price — Increased Exports and Imports Feature Past Year.

PRELIMINARY figures compiled by the United States Tariff Commission show that the domestic production of coal-tar dyes for the calendar year 1928 exceeds that for 1927 by approximately 1,400,000 pounds, and that progress in the manufacture of fast and specialty dyes has continued.

Before the World War the United States was largely dependent upon foreign sources for its supply of dyes. The domestic dye industry was developed during and after the war period when foreign supplies were not available. Synthetic colors are essential for the large domestic textile and other dye-consuming industries. In 1928, dyes of domestic production supplied about 92 per cent of our consumption by quantity and there was, in addition, an exportable surplus of the bulk low-cost colors amounting to over 32,000,000 pounds.

In 1928, production by 47 firms of approximately 96,600,000 pounds was an increase of 1.5 per cent over the production in 1927. Sales of dyes in 1928 were 93,300,000 pounds valued at $39,790,000. The quantity of sales shows a decrease of 5 per cent from 1927; the value of sales shows an increase of 3.3 per cent.

Outstanding features of American dye production in 1928 were: 1. Increase in production of vat and other fast dyes; 2. Production of many new fast and specialty dyes; 3. Reduction in the number of domestic manufacturers from 55 to 47; 4. Increase in unit price of sales of all dyes; 5. Increase in exports; 6. Increase in dye imports.

The production of vat dyes in 1928 established a new record with a total of more than 6,300,000 pounds, as compared with 5,961,688 pounds in1927. Before the World War there was no production of vat dyes in the United States and our entire consumption was imported from Germany and Switzerland. The increased consumption of vat dyes indicates that the public realizes that although the fast dye is more expensive, the cost of dye per yard of fabric or per garment is, in general, a small fraction of the total cost, and that it is more economical to invest in the fast-dyed fabrics or garments.

A summary of production and sales of dyes and other finished coal-tar products for 1928 is shown in Table 1. The total production exceeds the production of any year since 1918. In this summary, photographic chemicals and synthetic tanning materials are combined in order not to disclose the operations of individuals companies.

TABLE 1

Dyes and Other Finished Coal-tar Products: Domestic Production and Sales, 1928

Name of Product	*Sales* *Pounds*	*Sales* *Value*	*Production* *Pounds*
Finished products:			
Dyes	93,302,000	$39,790,000	96,625,000
Color lakes	11,366,000	6,464,000	11,447,000
Medicinals	4,005,000	8,651,000	4,008,000
Flavors	1,966,000	1,296,000	1,746,000
Perfumes	2,007,000	1,111,000	2,043,000
Synthetic phenolic resins	20,779,000	7,212,000	20,411,000
Synthetic tanning materials / Photographic chemicals	7,063,000	1,100,000	7,048,000
Miscellaneous coal-tar prod.	2,496,000	788,000	2,682,000
Total	142,984,000	$66,412,000	146,010,000

TABLE 2

Coal-tar Dyes: Domestic Production and Sales, 1914, 1920-1928

Year	*Production* *Pounds*	*Sales* *Pounds*	*Sales* *Value*
1914	6,619,729	....	....
1920	88,263,776	....	....
1921	39,008,690	47,513,762	$39,283,956
1922	64,632,187	69,107,105	41,463,790
1923	93,667,524	86,567,446	47,223,161
1924	68,679,000	64,961,433	35,012,400
1925	86,345,438	79,303,451	37,468,332
1926	87,978,624	86,255,836	36,312,648
1927	95,167,905	98,339,204	38,532,795
1928	96,625,000	93,302,000	39,790,000

The weighted average price of all domestic dyes sold in 1928 was 9.2 per cent more than the average for 1927. The following table shows the trend of the average prices of domestic coal-tar dyes in recent years.

TABLE 3

Domestic Dyes: Weighted Average Sales Price, 1917 - 1920 - 1928

Year	*Weighted average*[1] *sales price of domestic dyes* *Per pound*
1917	$1.26
1920	.99
1921	.83
1922	.60
1923	.545
1924	.54
1925	.466
1926	.42
1927	.39
1928	.426

[1]Total value of all dyes divided by the total quantity.

Price increases were recorded for certain low-priced dyes and decreases for many high-priced dyes. Indigo, the leading color made in this country, shows an average sales price of 14 cents per pound as compared with 12.1 cents in 1927, and 12.8 cents in 1926. In 1917, the first year domestic indigo was produced, it sold for $1.42 per pound. The 1914 invoice value of imported indigo was 12.8 cents per pound.

Coal Tar Dye Imports

The imports of coal-tar dyes in 1928 were 5.5 per cent. of total production by quantity and 10.5 per cent. by value. They were by quantity 8 per cent. of apparent consumption, assuming this to be equivalent to production plus imports minus exports. Based on preliminary figures, dyes manufactured in the United States, accordingly, supplied about 92 per cent of apparent consumption by quantity. By value, however, domestic production would be considerably less than 92 per cent. of consumption, as the average prices of dyes imported are much higher than the average price of domestic dyes. There was an exportable surplus of certain dyes, including indigo and sulfur black.

Exports of Coal Tar Dyes

The total exports of coal-tar dyes in 1928 were 32,059,078 pounds valued at $6,336,278. This represents an increase of 5,288,518 pounds in quantity and an increase in value of 15 per cent. over that of 1927.

TABLE 4

Dyes: Domestic Exports, 1920-1928

Year	*Pounds*	*Value*
1920	....	$29,823,591
1921	....	6,270,139
1922	8,344,187	3,996,443
1923	17,924,200	5,565,267
1924	15,713,428	5,636,244
1925	25,799,889	6,694,360
1926	25,811,941	5,950,159
1927	26,770,560	5,495,322
1928[1]	32,059,078	6,336,278

[1]Preliminary.

The imports of dyes during 1928 were 5,348,227 pounds, with an invoice value of $4,322,621. This represents an increase of 27.9 per cent. by quantity and 26.2 per cent. by value over that of 1927. Total imports in 1914, when our consumption was very largely supplied by imports, amounted to 45,950,895 pounds. Imports originate almost entirely in Germany and Switzerland.

TABLE 5

Coal-tar Dyes: Domestic imports, 1920-1928 and 1929 (3 months)

Period	*Pounds*	*Invoice value*	*Monthly average Pounds*	*Monthly average Value*
1920	3,402,582	$5,763,437	283,548	$480,286
1921	4,252,911	5,156,779	354,409	429,732
1922	3,982,631	5,243,257	338,850	436,838
1923	3,098,193	3,151,363	258,153	262,614
1924—first 9 months	1,611,931	1,642,632	179,103	182,515
last 3 months	1,410,608	1,266,146	470,203	422,049
Total	3,022,539	2,908,778	251,878	242,398
1925	5,209,601	4,637,240	434,133	386,437
1926	4,673,196	4,103,301	389,433	341,942
1927	4,182,026	3,423,918	348,502	285,326
1928	5,348,227	4,322,621	445,686	360,218
1929 (3 months)	1,710,271	1,368,272	570,090	456,091

The production of synthetic resins in 1928 by nine firms was approximately 20,400,000 pounds, a substantial increase over the production in 1927. The development of synthetic resins is distinctly an American achievement. The production and sales of synthetic resins for the years 1927 and 1928 are shown below:

Synthetic Resins: Production and Sales in 1927 and 1928

Year	*Sales Pounds*	*Sales Value*	*Production Pounds*
1927	13,084,313	$6,094,656	13,452,230
1928	20,779,000	7,212,000	20,411,000

The total output of intermediates in 1928 was 272,624,000 pounds, as compared with 240,073,184 pounds in 1927. Sales totaled 109,446,000 pounds valued at $23,265,000 or a unit value of 21.2 cents. In 1927 sales amounted to 92,917,439 pounds valued at $20,127,459, or 21.7 cents per pound.

The Industry's Bookshelf

The Industrial Development of Searles Lake Brines by John E. Teeple, PH.D., 182 pages, The Chemical Catalog Company, New York, $3.00 net.

The preface is a fine example of polite sarcasm; part 1, a fascinating human interest story; and part 2, a strictly scientific collection of equilibrium data and diagrams. One of the American Chemical Society monograph series, this book gives a well-rounded picture of the outstanding accomplishments at Searles Lake.

Peaks of Invention, by Joseph Leeming, 269 pages, The Century Co., New York, $2.50 net.

The story of a few of the most important inventions that have made the present era an outstanding one in the progress of man's mastery over Nature.

Petroleum, by Albert Lidgett, 160 pages, Isaac Pitman & Sons, New York, $1.50 net.

A history of the different phases of the petroleum industry, giving a story of the progress made during the last quarter of a century.

The Economics of Water Power Development, by Walter H. Voskuil, 225 pages, A. W. Shaw Co., Chicago, Ill., $3.00 net.

In which the factors governing the economic exploitation of water power resources are analyzed with a view towards determining just how valuable a source of power it should be considered.

Petroleum and Coal: The Keys to the Future, by W. T. Thom, Jr., 223 pages, Princeton Press, $2.50 net.

Stresses the economic importance of the international competition for adequate reserves of these two fuels, with the consequent effect upon the political and industrial world.

Industrial Marketing, compiled by Graduate School of Business Administration, Harvard University, 544 pages, A. W. Shaw Co., Chicago, Ill.

Volume 6 of the series of Harvard Business Reports, being a compilation of various cases dealing with industrial marketing.

Inorganic Chemical Technology, by W. L. Badger and E. M. Baker, 228 pages, McGraw Hill Co., Inc., New York, $2.50 net.

A textbook of current American practice in the various processes being operated in the production of the more important inorganic chemicals.

Chemical Plant Equipment

By C. E. S. Place
The Manchester Association of Engineers

ONE of the most common types of machinery used in a chemical plant is the centrifugal machine. This machine is manufactured in two distinct types, *i. e.*, underdriven, or overdriven. It is of simple design and is formed of an outer fixed cylindrical casing having a discharge outlet to one side; a perforated cylindrical casing is fitted within this outer casing leaving a clearance between the two casings. In operation of the underdriven type, the perforated inner casing is made to rotate at high speed by means of an underdriven vertical shaft. In the case of the overdriven type machine, the perforated inner casing or basket is fixed to the bottom of a vertical shaft, which in turn is carried by overhead supports, the drive being obtained through the medium of a flexible coupling connected to the spindle of an overhead vertical motor carried on the supports before mentioned.

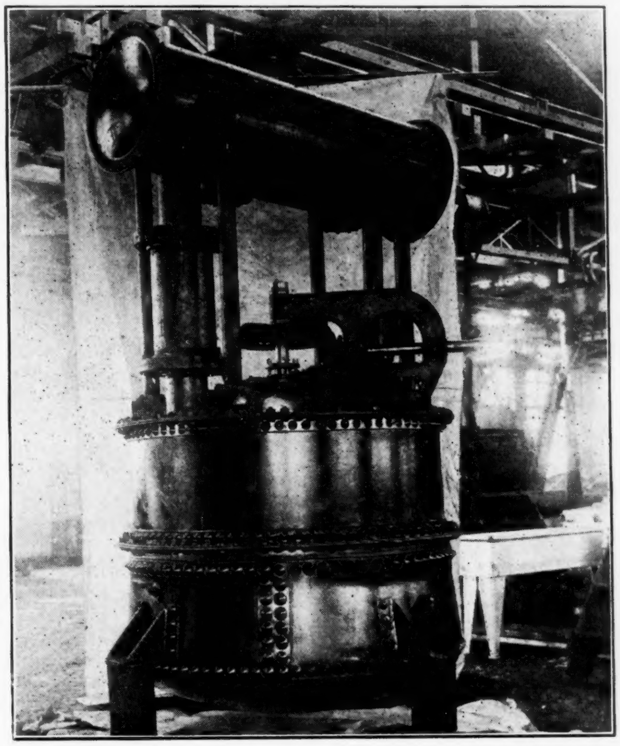
The action of the machine is, of course, obvious; materials containing liquid are fed into the inner cylindrical perforated basket which is rotated, the materials immediately form a layer round the perforated inner basket, and due to centrifugal force the liquids contained therein are discharged through either a gauze or filter cloth, which may be fitted on the inner face of the basket. These liquids are then discharged through the discharge outlet of the fixed outer casing, the remaining solids being scraped off when the rotating basket has come to rest. These are then either lifted out of the basket or discharged, as in the case of the overdriven type through a special valve situated at the bottom of the basket. In explosive manufacture this type of machine is used for freeing the spent acid from nitrated cotton and at a later period for freeing the liquid left after refining and blending. In dyestuffs manufacture it is also used for many manufacturing operations.

A pressure vessel which also figures very prominently in chemical manufacture is the "Autoclave." The most common type is the vertical. In one type of construction it is formed of a cylindrical steel shell, rolled and jointed by means of an external rivetted butt strap. This cylindrical shell is rivetted to a dished steel bottom. An external angle section, reinforced and fitted to the outside of the end opposite to the dished bottom of the main cylindrical section, forms the face upon which the joint between the cover and the Autoclave proper is made. A crowned steel cover is fitted, supplied with central bearing and gland, through which the shaft fitted with agitation blades is fixed. This cover has also special block pieces fitted for safety valve, pressure gauge and piping connections: a manhole and manhole cover are also arranged for. In forming a joint between the cover and the Autoclave body special asbestos tape packing, reinforced with lead, is used in the majority of cases. This packing should be supplied in an endless ring so that no jointing is necessary between the face of the cover and the face of the Autoclave upon which it rests. To the outside of the face where the joint proper is made, the cover and Autoclave are securely bolted together with bolts set at a close pitch. The agitation shaft carries on its lower extremity specially designed agitation wings, which when revolving scrape clear the bottom and sides of the Autoclave.

An interesting feature of the agitation shaft, which is driven by means of bevel gear carried on a cast-iron bridge, is the fact that it is hollow so that it may be used as a discharge pipe when the contents of the Autoclave are being blown over into the receiving vat after completion of the manufacturing operation. It has been ascertained that under certain working conditions in the presence of ammonia, the nature of the steel shell is appreciably affected, insomuch that it fractures under load, in a manner more peculiar to cast metal. This condition in the metal is always noticed below the liquor line. In Autoclaves and in other mild steel vessels the liquor line is nearly always clearly defined by a definite marking, where the acid conditions are more active so far as corrosive action is concerned. In a type of Autoclave of approximately four feet, six inches diameter and approximately six feet depth and suitable shell section, etc., the safe working pressure may approach 250 pounds per square inch. One interesting feature of the fitting connected to the gauge, etc., is the fact that by introducing an oil seal between the pipe entering the Autoclave and the gauge, the latter is protected from the introduction of foreign matter which might easily settle out to give quite incorrect readings.

The life of the shell and the bottom of an Autoclave such as has been described is naturally limited and experiments in connection with the fitting of an inner liner or partially duplicate shell have been tried with considerable success. As the majority of Autoclaves are heated by either direct fire or gas fire, it is necessary when an inner liner is fitted to have a ready means of heat transfer hence a mixture of say lead and tin is used. This mixture is run in hot after the inner shell or liner has been securely fixed down by means of angle cleats.

Numerous types of grinding machines are at present generally used, but there is very little difference in the principles applied but rather in constructional detail. The disintegrator type of machine has been in use for a considerable period, and has the advantages of considerable output plus simple construction, hence a minimum delay is experienced in overhaul. The K.E.K. grinding mill occupies much less floor space for output and is a very satisfactory type of mill. In construction it comprises a cast outer cylindrical casing, which is divided into two portions—the upper portion housing the grinding plates, and the lower the gear drives. The divisional casting dividing the upper from the lower portion carries through its centre a central worm shaft which seats itself in a special bearing at the bottom of the mill. This shaft is driven by a worm wheel secured to a horizontal shaft driven from the exterior of the casing. The grinding action is obtained by the rotation of a steel plate having a series of pins fixed to it at definite radii from the center, passing through rows of similar pins fixed to an inverted plate which is stationary. The rotating plate is fixed to the central worm shaft from which it derives its drive.



Courtesy L. O. Koven & Bro., Inc.

A high-pressure autoclave with condenser above it, a type in rather general use in certain of the chemical process industries.

Materials to be ground are fed in through an opening in the centre of the top of the mill, and after grindings are discharged through an outlet situated on the outer edge of the top side casing. The lower portion of the mill, *i. e.*, below the grinding chamber is an oil bath in which the worm drive operates. Very high speeds are attained by the rotating plate, and very efficient grinding results are obtained. In certain cases where particular materials are to be ground it is necessary to earth the machine from one of its foundation bolts, as an electrical charge is set up on the material during grinding operations. Many other grinding machines are obtainable, and some operate in a similar manner to the mill described with the exception that the plates lie in a vertical plane instead of horizontally.

There are numerous sieving machines on the market, but they usually perform the same operation within a definite cycle. The object of sieving is of course to obtain a standard or regular production and the majority of the machines are constructed with one or more shelves or trays reinforced and covered with gauze suitable for the product handled. These sieves are driven mechanically in such a manner that they move backward and forward, or upwards and downwards, so that an attempt is made to distribute the particles of materials to be sieved over the whole gauze surface constantly keeping these particles on the move. Notwithstanding the question of combined grinding and air separation plants, there is still scope for an efficient sieving machine, *i. e.*, a machine that will keep the gauze clear and clean whilst in operation, and in consequence obtain full advantage from an output point of view. It is therefore suggested that any machine performing the same or similar cycle of operations fails in this feature particularly so where coloidal substances are encountered. The particles to be sieved are very often of a carrot-like formation, so that once the tapered portion of the particle enters a mesh square, that square is useless unless the particle is of size which can pass through, as independent of whether the lifting or forward action of the same takes place, that particle simply rises and falls without clearing itself. The efficient sieve is the sieve so constructed as to react violently in such a manner that the particle is thrown clear.

An interesting feature of certain designs of sieves is the fact that a few bright steel balls such as used in ball race construction are introduced upon the top side of the gauze carrying material to be sieved. It will readily be noted that a certain amount of additional grinding can take place between the ball surfaces when in contact. Their introduction also assists in the prevention of the balling up in the case

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of certain materials, where the nature of the material is such that one particle tends to ball up upon another.

For the purpose of mixing various classes of dried and ground materials there are quite a number of machines of varied constructional form. They are of very simple mechanical construction, but difficulty is very often experienced in the lubrication of internal bearings, where the fine particles of material being treated often cause considerable trouble. One common type of mixer used considerably in the manufacture of dyestuffs is of the following construction. An outer casing is formed of metal sheet iron sides joined together by a semi-circular bottom. Cast iron endplates are fitted of similar cross section at each end of the casing. These cast iron endplates are fitted with central bearings, which carry a longitudinal central shaft. This central shaft in the larger type of mixers has an internal bearing supporting it in the centre of its span. To this shaft a series of blades are fitted the whole forming a scroll. In operation the materials to be mixed are carried forward by the rotation of the scroll blades, until the end of the mixer distant from the discharge outlet is reached. The blades are so arranged at this end of the mixer, that the movement of the material is reversed and the material is carried in the reverse direction until it has its direction of movement again changed at the outlet end of the mixer.

One of the greatest difficulties in the mixing operations carried out by a machine of this type is the fact that should settlement of the material take place due to a temporary stoppage of its movement resultant from either mechanical or electrical fault, then the greatest difficulty is experienced in overcoming the load produced. This load condition varies of course very considerably having regard to the nature of the materials being handled, but it may be safely said that under certain conditions it is only possible to handle a much less quantity of material in comparison with the specified capacity of the mixer. There are various methods adopted for driving the central shaft and scroll, *i. e.*, bevel gears-belt driven, worm gears, and spur gears. This latter type may be considered the most satisfactory.

Rough Crushing Machinery

Although the operations of mixing and grinding have been briefly dealt with there is an operation of a crude type which deals with the breaking up of materials in their rough form. This operation may be described as rough crushing and is usually carried out by some form of machine constructed with solid rollers in parallel having spiked or steel projections, which when the rollers rotate and the materials are fed thereon by means of a chute, cause a crushing action. It will be seen that in this type of crusher the output is limited by the speed of the rollers, and the clearance between them. The Author has seen some interesting experiments carried out by a machine, which may be said to possess a reverse crushing action to that described, and yet having a greatly increased output. This latter machine is constructed of hollow steel rollers which as in the former case rotate in parallel when crushing. The crushing action is not obtained by the materials being caught by the projections and forced between rollers as in the former machine, but by the fact that each of the hollow rollers is perforated leaving a sharp edge to each of these perforations. As the rollers rotate the material is caught by these edges, and is not only forced down between the rollers but also into these hollow central sections, so that a greatly increased output is obtained. The rollers are so inclined that all crushed materials travel to an end outlet where they are discharged into a common chamber, which also receives the crushed materials passing between the rollers proper. Internal perforated rollers may be fitted within the main rollers, so that by slight adjustment the openings of the free passage for material may be varied, this fact in conjunction with the adjustment possible between rollers makes it possible to obtain any size of rough graded crushed material. It will be seen that considerably less load is also required for driving purposes, as a much more free passage is provided for the travel of materials.

Acid Handling Equipment

The supply of acids for various purposes presents many interesting features. If the acids are not actually supplied from within the works then the general practice is to supply in either rail tank wagons, or by carboy. In some cases these cylindrical tanks which are secured to rail wagons are of mild steel shell, and are fitted with suitable connections for either discharging their contents by means of compressed air, or alternatively by pump. For certain acids these tanks are suitably lined within, with materials such as ebonite, etc., these linings being necessary to withstand the action of the particular acid transhipped.

An interesting development in connection with the treatment of acids, both from a point of view of storage and treatment at later stages during process manufacture, occurs in the marketing of a special preparation of compounded milled rubber which begins to cure at a temperature of approximately 80°C. and which enables vessels to be lined with rubber on the job. This preparation can be applied to all kinds of surfaces, even when in a bad condition. Mild steel cylindrical storage vessels, wooden vats, wooden filters, etc., can be suitably treated. It is also claimed that cracked or broken earthenware vessels may be effectively treated. Meters for measuring acids, valves, pumps, etc., may be procured in this material. Needless to say this preparation has a field in the engineering world, independent to its utilization for chemical works.

New Incorporations

Pierre Chemical Co., New York. American Guaranty & Trust Company, $250,000.

Philadelphia Carpenter Container Company, Inc., New York. Corporation Trust Co. of America.

Arrow Holding Corporation, Jersey City, N. J., drugs, chemicals. Registrar and Transfer Co.

Safety Fumigant & Chemical Co. Gibboney, Johnston & Flynn, 49 Wall St.

Carbo Cide Company, chemicals. M. Casper, 20 Pine St. 200 shs. com.

Elleness Chemical Co., Inc., Hartford, Conn., cleaning compounds. Corporation Service Company. 200,000.

Oxygen Equipment Corporation of America, Newark, manufacture oxygen apparatus. Dalrymple & Campbell, Newark. $100,000 pf. 3,000 shs. com.

Chester Laboratories, chemicals. R. C. Clements, 15 Broad St. 200 shs. com

Stewart Dupois, Ltd., Montreal, $20,000, chemicals. Thomas Stewart, Thomas A. Dupois, Louis C. Dupois.

Enamo Co., Ltd., Montreal. $25,000 and 10,000 no par shares, paints and varnishes. John F. Chisholm. Paul H. Hecht, Frank Wright.

Vego Humus, Ltd., Toronto, Ont., $50,000 and 50,000 no par shares, fertilizers. Hance R. Ivor, Robert F. Hardy, Arthur H. O'Brien.

Canadian Gas and Equipment Co., Ltd., Windsor Ont. $100,000, oxygen and acetylene gas. William C. Wall, Albert F. Wall, Oscar E. Fleming.

Eureka Composition Co., chemicals. L. Ferkin, 25 West 43rd St., 20,000 shs.

Vasco Products Co., Elmira, N. Y., cleaning fluids. Barnes & Cucci, Binghamton, N. Y. 50,000 shs.

Castro Chemical Corp. H. Amszer, 276 Fifth Ave., N. Y. 100 shs. com,

Ducleen Chemical Products Corp. Horstmann & Kozinn, 505 Tremont Ave., 10,000 shs.

Lang & Co., Inc., Pittsburgh, Pa., perfumes, chemicals. Capital Trust Co. of Delaware. 5,000 shs.

Nu-Pine Chemical Co. H. Emerson, 1540 Broadway. $30,000 pf. 100 shs. com.

Nikalgin Laboratories, chemicals. Gordon & Young, 67 Wall St. 500 shs. com.

Crusaders Academy of Science, research. V. A. Distasio, 11 Park Place. 20,000 shs.

Klebro Bandage Co., Buffalo, N. Y., chemicals, drugs. A. J. Adler, Buffalo, N. Y. 100,000 shs.

Golden Ray Mfg. Co., Inc., Wilmington, Del., chemicals. Corporation Service Co. 1,000 shs. com.

Gill Service Stores, Inc., Wilmington, Del., chemicals, paints, oils, dyestuffs. Corporation Trust Co. of America. 7,500 shs.

Stainex Corp., Philadelphia, Pa., wood stains, paints, enamels. Capital Trust Co. of Delaware. 100 shs. com.

The Triple Ex. Corp., Wilmington, Del., wood, its by-products. Corp. Trust Co. of America. $250,000. 10,000 shs. com.

Atlantic Fisheries Co., Lewes, manufacture fish oil, fish meal. Alfred T. Hart, Lewes. 125,000 shs. com.

National Lighting Products Corp., Wilmington, Del., manufacture wood pulp. Corp. Trust Co. of America. 50,000 shs. com.

Vyo Laboratories, Inc., Wilmington, Del., drugs, medicines, chemicals. Corp. Trust Co. of America. 5,000 shs. com.

Southwest Mutual Products Corporation, New York, chemicals. Orem T. Wharton, Dover, Del. 500,000.

Patent for the treatment of artificial silk with tin compounds is issued to Dr. G. H. Ellis, chemist for British Celanese Co., covering a process for "loading" artificial silk yarns with sodium or potassium stannate. The chief advantage claimed for the tin treatment is that it gives the artificial silk a greatly increased resistance to heat, making it possible to iron these fabrics at a higher temperature than was heretofore possible. Another advantage claimed is that the tin compounds greatly increase the affinity of the material for various dyes, widely increasing the number and variety of tints that may be produced. The loading of real silk with tin has been standard practice for many years, the tin often constituting as much as 50% by weight of the finished fabric.

Gypsum industry is preparing plans for establishment of an organization within the industry to enforce code of practices which is expected to eliminate abuses which have grown up in the industry. Text of resolution adopted at recent trade practice conference is being studied and a second conference will be called to discuss remedies suggested.

Dyestuffs department, E. I. du Pont de Nemours & Co., Inc., announces a new vat red, Ponsol Red G2B Double Paste.

Cornstalk Products Co. elects Clarence A. Brown, president, succeeding W. J. Day, who becomes chairman of the board.

Industrial Chemical Sales Co. announces removal of offices to the New York Central Building, 230 Park ave., New York.

Hoover Co. and Ruhm Phosphate & Chemical Co., announce removal of Chicago offices to 2300 Willoughby Tower, that city.

Chemical Foundation announces removal to twelfth floor, Manhattan Life Building, Madison ave. and 60 st., New York.

New Plant Construction

Century Carbon Co. is proceeding with an expansion program involving the construction of four new units of 32 houses each on recently acquired properties in the Richland, La., field. Company has access to 3,000 acres of gas fields in that location and this expansion is expected to add 10,000,000 pounds of carbon black annually to present production.

American Glanstoff Corp. plans immediate erection of addition to rayon mill at Elizabethton, Tenn, consisting of a complete second operating unit, with chemical processing and other equipment, chemical laboratory and other departments, with capacity practically to double present output. Cost of addition is estimated to be about $5,000,000.

Duval-Texas Sulphur Co., Corpus Christi, awards contract for installation of a second battery of boilers and other equipment which will double present capacity of plant. First unit began operations November 1, 1928 and has ready for shipment over 15,000 tons of sulfur. Company is subsidiary of United Gas Co.

Chemical & Wool Industries, Ltd., London, is reported to be planning establishment of large rayon plant in Jugo-Slavia, and to be negotiating with the I. G. Farbenindustrie, for license to use the I. G.'s viscose and acetate patents. The I. G. has denied that any such negotiations are taking place.

Canadian Industries, Ltd., makes contract with International Nickel Co. by which the former will erect a plant at Copper Cliff, Ont., to manufacture nitre cake, to be supplied to International Nickel for use in its refining processes.

American Cyanamid Co. plans construction of $3,500,000 plant near Tampa, Fla., for manufacture of phosphoric acid. Plant will be constructed on filled in land on the shore bordering Hillsborough Bay.

Grasselli Chemical Co. plans to rebuild portion of Birmingham, Ala., plant recently destroyed by fire with reported loss of more than $1,000,000 including buildings, equipment and stock.

Hanovia Chemical & Manufacturing Co. acquires property near its plant in Newark, N. J., consisting of several buildings which will be remodeled at approximate cost of $100,000.

Abbott Laboratories, Inc., North Chicago, plans construction of new plant unit at Libertyville, Ill., one or two-story type, estimated to cost about $100,000 including equipment.

Henry Bower Chemical Manufacturing Co., Philadelphia, ammonia, plans new one-story plant unit, designed primarily for laboratory service, to cost more than $35,000 with equipment.

H. Kohnstamm & Co., New York, colors and chemical specialties, purchases a two story factory in Buffalo which it will remodel and improve for new branch plant.

Canadian Industries, Ltd., plans to erect plant at Copper Cliff, near Sudbury, Ontario, for the manufacture of sulfuric acid. Estimated cost is £300,000.

Brown Instrument Co., Philadelphia, plans construction of new two-story and basement building to cost approximately $200,000.

British Celanese, Ltd., plans to double capacity of plant at London, England, giving company total capacity of 48,000,000 pounds per year.

Proctor & Gamble Co. files plans for new $1,500,000 plant at Locust Point, Md., thus beginning construction work.

Handling, Packing and Shipping

TARE WEIGHT---

A Perplexing Factor in Chemical Sales

By H. G. MacKelcan
Sales Manager, Innis, Speiden & Co., Inc.

Chemical shipments carry the problem of the "tare" unfailingly in their wake. Not only does this too-often disregarded item involve thousands of dollars, but it has also encouraged certain abuses not in conformity with the best trade practice. The entire subject is of distinct importance to both the buyer and the seller of chemicals; neither should fail to consider carefully the facts pointed out by Mr. MacKelcan in his discussion of tare weight in relation to chemical merchandising.

FAILURE to take into consideration the additional factor of tare weight in determining costs doubtless accounts for many thousands of misdirected dollars per year in the merchandising of chemicals. Accompanying this situation and aggravating it, is the fact that the tare furnishes a convenient loophole for the entrance into chemical selling of certain abuses from which the industry for many years, has been endeavoring to free itself. Since the railroads, logically enough, base their charges upon the gross weight of a shipment, the tare seems an inevitable corollary to the transportation of chemicals. It only remains for both buyer and seller to realize the presence of this factor in a greater or lesser degree, depending upon the chemical, in order that the entire situation be clarified.

Too often, however, the buyer of chemicals takes the f. o. b. price which has been quoted, adds the freight rate to it, and considers the resultant figure as his delivered cost. But when he comes to check the *actual* delivered cost against what he had figured as the delivered cost, he awakens to the fact that the commodity cost him more than he had anticipated.

As the tare is really the cost of transporting the container in which the chemical is shipped, its percentage of the actual delivered cost of the shipment varies greatly according to the container and the merchandise packed in it. The tare may represent a considerable loss to the buyer if he has failed to consider it in his costs, especially if he is buying light weight materials. On naphthalene flake, for instance, the tare represents 11 per cent. of the freight rate and must be added to the particular rate if the actual delivered cost is to be arrived at. On the naphthalene rate applying from New York to Texas common points it represents 22 cents per 100 pounds, or an additional ¼ cent per pound to be considered as part of the cost. On ammonia or sulfuric acid in drums the tare may run as high as 15 to 20 per cent., and thus make an enormous difference between the f. o. b. plus freight quotation, and the actual delivered price. On the other hand, a commodity like gum arabic, packed in bags, carries tare charges of only about two per cent. On "liquids" generally, the tare for both wooden barrels and drums is usually, on 50 to 55 gallon capacity containers, from 15 to 20 per cent., which must be added to freight rates.

Examples might be multiplied endlessly, but the fact remains that whether the freight rate is low or high, the tare has the same basic relation. In the case of the high freight rate, the tare represents a considerable loss to the buyer if he has failed to consider it in his costs. It is as much a part of his cost as the f. o. b. price and the freight rate, and only by including it in his calculations can he arrive at his costs on a definite and accurate basis.

Another phase of the situation which has developed out of the tare problem is the fact that it permits of certain abuses both by buyer and seller which are not in keeping with the best trade practices. The astute salesman and the shrewd buyer have discovered that they can use the tare to advantage either in buying or selling, as the case may be. The salesman, for example, salves his conscience on price cutting by quoting a delivered price to the buyer without adding in the freight on the tare. The buyer, on his part,

will ask for quotations on a delivered price with the knowledge or expectation that some one of the sources of supply will quote a delivered price without figuring in the tare.

Many salesmen are at a loss when told by a buyer that he has obtained a lower price, when the real facts of the case may be only that the buyer has failed to take into consideration the tare and the freight he has to pay. In many instances, the only difference which prevails in the various quoted prices received by the buyer, is the fact that the salesman is figuring his cost on the actual cost of the material, plus freight on the material and on the tare, whereas the buyer is simply figuring the actual cost plus freight, and omitting the tare. Experience of this sort has shown that in most instances the freight on the tare will vary between three cents and six cents per hundred pounds in the cost, depending upon the product and the type of package in which it is shipped.

The above are the basic ramifications of the tare problem, which arising out of the mere transportation and shipping of chemicals, has spread until it now encompasses merchandising and selling as well. It will only cease to be a problem when buyer and seller as well take full cognizance of it and insist always upon taking it into account in determining quotations and costs.

A general conference of manufacturers, distributors and users of tight wooden barrels and kegs will be held in St. Louis, Missouri, on May 16th, 1929, in conjunction with the convention of the Associated Cooperage Industries of America, according to the Division of Simplified Practice, Bureau of Standards, United States Department of Commerce. William E. Braithwaite, Division of Simplified Practice, has been working with the Standardization Committee of the Association, in developing the proposed Simplified Practice Recommendation, covering lengths, and thicknesses of staves, diameter and thickness of heads, bilge circumference and distance from croze to finished end of stave for 5, 10, 15, 30, 45, 50 and 57/58 gallon sizes.

Alsop Engineering Co., New York, receives patent No. 1,693, 170, fully covering its "HY-SPEED" portable electric mixers, with push-pull propellers. This is said to be the only patent ever issued on portable electric mixers.

The company announces that it does not intend to use this patent against concerns who have already bought other types of equipment, but that it will protect its patent rights on any new equipment purchased which might infringe on its claim.

Magnetic Manufacturing Co. announces the issuance of a new bulletin, No. 80, especially devoted to "Magnetic Separation Equipment" for the concentration of ores and minerals. Copies may be obtained upon application to the company's home office at Milwaukee.

Suspension of the railroad container car tariff is likely to be lifted, at least temporarily, in order to meet demands of shippers who use it, according to developments in hearings held by Interstate Commerce Commission. It is thought that there will be no final decision on the subject for at least six months.

Du Pont Cellpohane Co. announces appointment of C. E. Lake, formerly Eastern district sales manager, as assistant director of sales of the organization. J. C. Jorgensen, formerly assistant district sales manager, succeeds him as district sales manager.

Freight Rate Decisions

New York Public Service Commission approves new freight rates as follows:

New York Central (East)—Ammonia, chloride of (muriate of ammonia or sal ammoniac), in bulk in bags or in barrels, carload, minimum weight in barrels 40,000 pounds and in bags 50,000 pounds, from Syracuse and Solvay to Black Rock, Buffalo and East Buffalo, 13.5c; reduction 8c per cwt. Effective May 5.

Of the West Shore, same commodity from Syracuse to Black Rock, Buffalo and East Buffalo, 13.5c; reduction 8c per cwt. Effective May 5.

New York Central (East)—Benzol in packages, carload minimum weight 30,000 pounds, and in tank cars, carload, from Black Rock, Buffalo and East Buffalo to Raquette Lake railway stations: Eagle Bay (Fourth Lake), 42.5c per cwt; Raquette Lake, 47c per cwt. Reductions. Effective May 6.

New York Central (east) on ammonia sulfate, c. l. from Troy to Yonkers, 15 cents, a reduction of 5 cents per cwt., effective March 28.

Erie on muriatic, sulfuric, and nitrating acids, in carboys, barrels or drums, c. l. minimum weight 30,000 pounds, from Black Rock, Buffalo and East Buffalo to Depew and North Tonawanda, 7 cents a reduction of 1 cent per cwt.

Reduction of 2.5 cents to 9 cents per hundred-weight, in the freight rate of the Fonda, Johnstown & Gloversville Railroad on carloads of soda sulfide, minimum weight 30,000 pounds, from Fonda to Gloversville. The new rate will become effective May 6.

In case of the State of Alabama and Alabama Public Service Commission, appellants, against the United States of America, Atlantic Coast Line Railroad Company, Seaboard Air Line Railway Company et al., the Supreme Court of the United States holds that the order of a statutory three judge court denying the appellant a preliminary injunction enjoining certain railway companies from making public an order of the Interstate Commerce Commission establishing intrastate rates on fertilizers and fertilizing material in Alabama, was not an abuse of discretion. Without deciding the merits, the decree of the lower court affirmed. An order granting or denying a preliminary injunction it was held, will not be disturbed by an appellate court unless the discretion was improvidently exercised.

Steel drums, containers of peanut oil, which, after importation, are sold to second hand dealers, must pay duty at the rate of 25% ad valorem, under paragraph 328, act of 1922, according to a decision just announced by the United States Customs Court. Claim of the American Shipping Co. for free entry of these drums is over-ruled. Judge Young, in summarizing the court's conclusions in this test case, points out that, in order that drums, the ordinary containers of specific duty or free goods, become admissible free of duty, they must not only be in such condition that, when imported, the removal of their contents precludes their further use as containers of merchandise, but they must not enter the commerce of the United States in competition with similar articles.

Revolvator Co., Jersey City, publishes bulletin 83-1, describing the "Zee Bar Construction," which is now applicable to all its equipment. Copies furnished upon request to the company.

Ajax Electrothermic Corp., Trenton, N. J., issues bulletin 4a on 3 KV-A Converter and Furnaces for melting metals without the presence of carbon by means of an induced current.

Oxweld Acetylene Co., New York, issues booklet entitled "High Test Welding Rod," describing a new rod for making stronger welds in steel.

Steel Barrel and Drum Industry Shows Progress in Standardization

While some manufacturers of steel barrels and drums are finding it necessary to make certain special sizes, the degree of adherence to the simplified practice recommendation covering these commodities is quite high and on the upward trend, according to Ray M. Hudson, Assistant Director of the Bureau of Standard's in charge of the Commercial Standards Group.

In 1925, a total of 84 per cent. of the total steel barrels and drums produced by the acceptors of simplified Practice Recommendation No. 20—Steel Barrels and Drums—were in accordance with the simplified list of sizes. In 1926 the percentage had increased to 89 per cent.

The steel barrels and drums industry came to the Division of Simplified Practice of the Bureau of Standards, for assistance in 1924. A general conference was held on March 26, of that year, and the simplified practice recommendation, now known as No. 20—Steel Barrels and Drums, was adopted. The original recommendation listed 24 sizes, after an elimination of 42 sizes. At the request of the Standing Committee of the industry, a second general conference was held on December 7, 1927, and one size of drum added to the list.

Phosphate rock, in its natural state, shipped from Morocco to Baltimore at a c.i.f. value, is dutiable on the basis of the home market price at which it is sold in Morocco, according to a decision given March 29 by the United States Customs Court. This decision reverses the finding of the appraiser that the antidumping law applied, and that the value was that of the foreign (export) market, $7.58 per ton, instead of the invoice prices of $6.50 to $7, less freight charges of from $2.05 to $2.50 per ton, at which the shipments were entered.

The customs court held that the fact that farmers and factories in Morocco cannot resell phosphate rock for export does not affect the home market as being a freely offered one. The case in which the decision was given was that of J. H. Cottman & Co., versus the United States (reappraisements 81809-A, etc.).

Imperial Chemical Industries, Ltd., is planning some form of merger with British Celanese, Ltd., according to unconfirmed rumors from London. Imperial Chemical Industries is known to be interested in a projected rayon factory in Jugoslavia, capitalized at £1,000,000. Following as it does, on a similar report concerning British Celanese, it has given impetus to rumors that the I. C. I. plans to acquire a financial interest in the rayon firm. Not only would Celanese gain industrial and financial strength, but the I. C. I. would have access to the many valuable patents held by the former.

United States Bureau of Customs modifies regulations governing denaturing of olive oil for denaturing purposes so that requirements now read as follows: "From 105 to 114 pounds of caustic soda or sufficient caustic soda to cause complete saponification, or 354 pounds of caustic potash solution containing 45 per cent. of actual caustic potash." Modification was at request of soap manufacturers who claimed the new formula would make the oil easier to use in soap manufacture.

Sir James Irvine, principal, University of St. Andrews, is recommended by the committee of the Franklin Institute, Philadelphia, as recipient of the Elliott Cresson Medal "in consideration of his brilliant researches in the field of carbohydrate chemistry."

Dr. Julius Klein, director, Bureau of Foreign and Domestic Commerce, Department of Commerce, is appointed by President Hoover to be Assistant Secretary of Commerce.

Bureau of Customs directs the free entry of sodium selenite under paragraph 1658, tariff act of 1922, as "selenium, and salts of."

Montecatini Report Indicates Italian Chemical Progress

The Montecatini group manufactured during the past year 771,791 quintals of copper sulfate (as compared with 713,732). In regard to nitrogenous fertilizers it is pointed out in the annual report of the company, that consumption in Italy during the past year amounted to 2,728,500 quintals, a considerable increase on the 1,982,000 quintals of the preceding year. Sales of sulfate of ammonia in Italy were 1,070,000 quintals (814,000 in 1927), of nitrate of ammonia 170,000 (122,000) and of nitrate of lime 123,000 (37,850). Consumption of nitrate of soda was 580,000 quintals (against 385,000). The selling price of nitrogenous fertilizers has been particularly low. Italian consumption of calcium cyanamide was 780,000 quintals (against 623,000 quintals), and the Italian producers have recently formed a syndicate to regulate the production and trade in this fertilizer. In regard to potash the Montecatini report states that the concern "has a project in hand which will assure to Italy the production of potash," but no further details are given. In regard to phosphatic ferilizers the report points out that Italy is the second largest producer of superphosphate in Europe and the third most important in the world. Imports of phosphate into Italy in 1928 were 611,233 tons (after the 850,316 tons of 1927). Italian consumption of superphosphate was 13,120,000 quintals, of which the Montecatini group supplied 7,582,993 quintals. The large superphosfate output in Italy has necessitated the closing down of some plants and the restriction of output of others. Consumption of basic slag was 1,000,000 quintals and of potassic fertilizers 580,000 quintals.

In regard to sulfur the report states that production at the mines of the combine in the Marches and Romagno was 68,016 tons (against 63,942 tons), at Gallitano (Sicily) 10,976 tons (against 11,976 tons), and at Grottacalda 17,456 tons (against 18,512 tons). Total production of sulfur in Sicily was 215,283 tons (as compared with 231,441 tons in 1927) and came from 247 mines. In the future the Sicilian production of sulfur may be taken as about 125,000 tons. The total Italian production of sulfur is capable of reaching 350,000 tons. Italian production of bauxite was 148,000 tons, a considerable increase on the 95,300 tons of 1927, and exports are growing. Leucite output last year was about 40,000 tons and the Montecatini concern has obtained permits to search for further leucite deposits.

Obituaries

James H. Wilson, first vice-president and one of the founders, Wilson & Bennett Manufacturing Co., steel containers, Chicago, dies March 27, aged 78. He was a native of Canada and to went Chicago about fifty-three years ago. For a time he was in the hardware business, but later invented a number of containers and began to manufacture them.

John E. Davidson, who retired in 1926 after 60 years in the British chemical industry, died in Tynemouth, Eng., March 23, aged 77. He was formerly managing director, New castle Chemical Works Co. and United Alkali Co., and for many years chairman, National Saltcake Assn.

Martin Nilsson, head of the chemistry and research department, Fleischmann Manufacturing Co., dies in New York, April 9, aged 55.

E. B. Dennis, president, L. E. P. Dennis Co., fertilizer manufacturer, Crisfield, Md., dies in Baltimore, March 22, aged 59.

Charles V. Cashin, sales manager, Denver branch, Johns-Manville Co., dies March 19, aged 35.

Henry W. Somers, a former president, General Carbonic Co., dies March 23, aged 62.

Imperial Chemical Industries Reports Progress During Year

Imperial Chemical Industries, in annual report, states that the position of the merger as one of the predominant manufacturers of heavy chemicals in the world has been maintained. On the ammonia soda side an extensive modernization program has been practically completed. The increased production of artificial silk has resulted in a demand for more caustic soda and chlorine, and additional plant has been and is being brought into operation. Consideration is being given to the re-organization of the company's sulfuric acid manufacture. A plant to manufacture cement and sulfuric acid from anhydrite is in course of construction. Early in 1929 a plant for the manufacture of methanol from water gas was started up, while a plant for the production of acetic acid is well advanced.

Production of fertilizers at the works of Synthetic Ammonia and Nitrates, Ltd. at Billingham, has proceeded in accordance with the company's plans. The first of the large units was completed early in 1928, the second will be started up shortly, and the third should be completed by the end of 1929. This will complete the building program embarked upon two years ago. The products manufactured include sulfate of ammonia, nitrochalk, ammonium nitrate, sodium nitrite, nitric acid, ammonium bicarbonate, anhydrous ammonia, and methyl alcohol, and a plant for the production of complete fertilizers will be completed by the end of 1929. Upwards of a quarter of a million tons of nitrogen products were made during 1928, and were introduced on the market, mainly as sulfate of ammonia. The greater portion of the increased production of nitrogen has been sold overseas, and notable progress has been made in the Far East, especially in China. Work in India is being prosecuted with unabated vigour. In Scotland, the Scottish Agricultural Industries, Ltd., has been formed. The research station at Jealott's Hill Farm has now been completed, and will form yet another link in the great chain of scientific institutions now being forged throughout the Empire.

As regards dyestuffs satisfactory progress is being made both technically and commercially, and several important additions have been made to the range of colors produced. The policy of the British Dyestuffs Corp., Ltd., represents in effect a national attempt to establish a British industry which has as its objective the independence of the country in the production of dyestuffs and inorganic chemicals. With this end in view, the company has made substantial reductions in the prices of dyestuffs, representing a considerable present sacrifice but justifiable as tending to place this side of the business on a more healthy basis, and at the same time giving assistance to dye users.

The company's interests in the principal Dominions are, progressing satisfactorily. In Canada, the activities of Canadian Industries, Ltd., continue to develop. In Australia and New Zealand progress is also satisfactory, particularly in the awakening of interest among the farming population in the use of nitrogenous fertilizers. India, too, shows great development in this and other directions. In South Africa, African Explosives & Industries, Ltd., with which this company is associated with De Beers Consolidated Mines, Ltd., has shown further progress during the past year. A further 50,000 ton superphosfate plant is about to be erected there. Offices have been opened in Egypt and in Palestine. In South America the previous organizations of Imperial Chemical Industries have been strengthened by the formation of selling companies on the River Plate, in Brazil, in Chile, and in Peru.

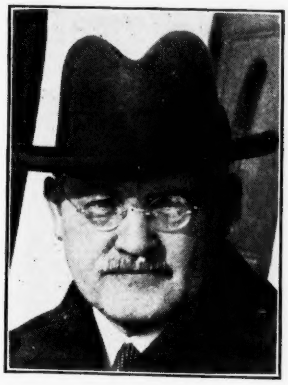
The Finance Company of Great Britain and America, Ltd., in which this company has a half interest, has achieved satisfactory results. The negotiations commenced in 1927 to acquire the businesses of Elliott's Metal Co., Ltd., and British Copper Manufacturers, Ltd., were completed during the year. Practically the whole of the share capital of these companies is now held by Imperial Chemical Industries, Ltd. The Welsbach Light Co., the Tees Salt Co., and interests in certain other companies were also acquired by exchange of shares.

Chemical Facts and Figures

American I. G. Chemical Corp. Formed With $60,000,000 Assets

New Company Links German Organization With American Industrial Leaders Including Walter Teagle, Edsel Ford, Charles Mitchell and Paul Warburg—H. A. Metz, Adolph Kuttroff and William E. Weiss also on Board of Directors.

Finally setting at rest all rumors concerning American plans of the I. G. and creating quite a satisfactory furor in chemical circles, the formation of American I. G. Chemical Corp., linking the German I. G. with some of the biggest names in American business and finance, is announced April 26. The company enters the American field with assets valued at $60,000,000 and with a board of directors including in its personnel the following: Prof. Dr. Carl Bosch, chairman of the executive Committee, I. G. Farbenindustrie; Walter Teagle, president, Standard Oil Co. of New Jersey; Charles E. Mitchell, chairman, The National City Bank of New York; Edsel B. Ford, president, Ford Motor Co.; Paul M. Warburg, chairman, International Acceptance Bank, Inc.; Adolf Kuttroff, retired president, Kuttroff, Pickhardt & Co.; H. A. Metz, president, General Aniline Works, Inc.; W. E. Weiss, vice-president, Drug, Inc.; Dr. Hermann Schmitz, member, Executive Committee, I. G. Farbenindustrie; Dr. Wilfrid Greif, member, Executive Committee, I. G. Farbenindustrie.



Dr. Carl Bosch

The outstanding capitalization of the American company will consist of $30,000,000 of guaranteed 5½ per cent. convertible debentures, which will be offered to the American investing public to-day by a banking syndicate headed by the National City Company; 400,000 shares of Class A common stock of no-par value and 3,000,000 shares of no par value Class B common stock.

Formation of the American I. G. Chemical Corporation was accomplished under the banking auspices of the National City. All of the common stock of the corporation will be issued against cash or for the acquisition of stocks of certain American chemical companies, including a substantial interest in the Agfa-Ansco Corporation, the second largest company in this country engaged in the manufacture and sale of films and photographic materials, and the General Aniline Works, Inc., formerly the Grasselli Dyestuffs Corporation, manufacturers of synthetic organic chemicals and dyestuffs. The former maintains factories in Binghamton, Johnson City and Afton, N. Y., while the latter operates plants in Albany, N. Y., and Linden, N. J. All these plants are to be made available to the new corporation for the further development of its wide range of products.

The debentures are convertible at any time prior to Jan. 1, 1939, into common A shares of the American I. G. Chemical Corporation at the rate of seventeen shares per $1,000 of debentures up to Dec. 31, 1931; during 1932 in sixteen shares, the number declining each subsequent year at the rate of one share a year until 1938, when the conversion rate is to be ten shares per one $1,000 debenture. The debentures are callable at 110 before Nov. 1, 1938, and at 100 thereafter.

It is provided that for any sums declared as dividends by the directors, each common A share will be entitled to receive dividends at the rate of $1 for each 10 cents paid on the common B shares. In case of liquidation the common A shares are entitled to receive $75 a share before any payment is made upon the common B shares, and any balance must be distributed in equal amounts per share between the two classes. Both classes have the same voting rights per share.

Important activities of the new company will be in the development and distribution in this country and elsewhere of a wide variety of products, including gasoline from coal, dyestuffs, pharmaceutical articles, fungicides, organic and inorganic chemical products, solvents and lacquers, light metals, photographic articles and films, artificial silk, synthetic nitrogen fertilizer and other nitrogen products.

The I. G. earned last year net profits equivalent to more than $45,000,000 and it is classed as the largest industrial corporation in Europe. It employs more than 140,000 persons. The present market value of its outstanding common stock is more than $450,000,000.

Chemical Advisory Committee Recommends Another Conference

Chemical Advisory Committee to the Department of Commerce recommends to Secretary of Commerce Lamont, that a conference of chemical executives be held in Washington in the near future for the purpose of considering the problems of the industry in foreign trade. Following the practice adopted with respect to the conference held in February, 1928, the advisory committee recommended that, in planning for the proposed meeting, the department consider the possibility of calling to Washington foreign representatives who are specializing in chemical matters. At the conference last year, the chemical executives were given an opportunity of hearing the views of, and conferring with, Assistant Commercial Attache Reagan of Paris and Trade Commissioner Daugherty of Berlin.

During its session the committee acted favorably upon the suggestion made at the recent conference of commercial attaches held in Vienna that the foreign offices of the department covering chemical matters in Europe be brought together in the near future at some convenient point for the purpose of organizing the work. Among the European representatives specializing in chemicals are Assistant Trade Commissioner H. S. Fox at London, Trade Commissioner E. Humes at Rome, Assistant Commercial Attache Reagan and Trade Commissioner Daugherty. Such a conference would also include representatives of the department's offices in Brussels, Warsaw, Prague and Berne, which are actively engaged in furthering the foreign business of the American chemical industry.

The suggestion was also made to Secretary Lamont that in view of the excellent results which the chemical industry feels it has achieved through the various departmental conferences the plan be extended to other industries, which are actively interested in foreign trade.

American Institute of Chemists presents its medal of honor to Dr. and Mrs. Francis P. Garvan, at a meeting in the Engineering Societies building, New York, May 4. Dr. Charles H. Herty presided, while speakers included the Hon. John W. Davis, Dr. John J. Abel, and Dr. John J. Finley.

Chemical Industries Banquet Features Exposition Week

Col. William J. Donovan is Speaker of the Evening at Banquet Sponsored by Salesmen's Association—Unusual Exhibits Draw Large Crowds to Twelfth Exposition of Chemical Industries.

Sixth Chemical Industries Banquet, sponsored by the Salesmen's Association of the American Chemical Industry, and held in the Hotel Roosevelt, May 9, features the week of the Twelfth Exposition of Chemical Industries in the Grand Central Palace, New York, May 6-11. William J. Donovan, former assistant to the Attorney General of the United States, was the speaker of the evening on the general subject of the relation of government to industry. Ralph E. Dorland, Dow Chemical Co., president of the association presided and introduced Charles C. Concannon, chief, Chemical Division, Bureau of Foreign and Domestic Commerce, who in turn introduced Col. Donovan.

William J. Donovan

Among the other organizations of the chemical industry which co-operated with the Salesmen's Association in making this banquet the most successful of the series were the American Association of Textile Chemists and Colorists, American Chemical Society, American Electrochemical Society, American Institute of Chemists, American Leather Chemists' Association, Chemical Warfare Association, Chemists' Club, Compressed Gas Manufacturers' Association, Manufacturing Chemists' Association, Societe de Chemie Industrielle, Society of Chemical Industry, Synthetic Organic Chemical Manufacturers' Association Technical Association of the Pulp and Paper Industry and the Chlorine Institute.

The exposition, in connection with which the banquet was held, was also well attended during the entire week. Among the exhibitors were Abbe Engineering Co.; Adams Bag Co.; Air Reduction Sales Co.; Ajax Electrothermic Corp.; Alsop Engineering Co.; Amer. Bag Co.; Amer. Doucil Co.; Amer. Hard Rubber Co.; Amer. Solvent Recovery Corp.; Amer. Tar Products Co.; Amer. Zeolite Corp.; Amersil Co., Inc.; Arkell Safety Bag Co.; Armstrong Machine Works; Bakelite Corp.; Baker & Co. Inc.; Bates Valve Bag Co.; The Brown Instrument Company; Buffalo Bag Co.; Buffalo Foundry and Machine Co.; Burgess-Parr Co.; Burt Machine Co.; Carbo-Freezer Co.; Carboloy Co. Inc.; Carborundum Co.; Carpenter Container Co.; Carpenter Steel Co.; Celite Products Co.; Celluloid Corp.; Central Alloy Steel Corp.; Chase Bag Co.; CHEMICAL MARKETS; Chemicolloid Laboratories; Chemists' Club; Chromium Corp. of America; Cleveland-Akron Bag Co.; Colwell Cooperage Co.; Cooper Hewitt Electric Co.; Corning Glass Works; Crucible Steel Co.; Cuno Engineering Corp.

Darco Sales Corp.; J. H. Day Co.; J. P. Devine Manufacturing Co.; Dings Magnetic Separator Co.; Dorr Co. Inc.; Douthitt Engineering Co.; The Duriron Co.; Eastern Steel Barrel Corp.; Eastman Kodak Co.; Economic Machinery Co.; Electro Bleaching Gas Co.; Electro Chemical Supply & Engineering Co.; Ellis Dryer Co.; Emery Carpenter Container Co.; Emery Industries, Inc.; Charles Engelhard Inc.; Edward Ermold Co.; Everlasting Valve Co.; Fairbanks Co.; The Fansteel Products Co., Inc.; Fetter Steel Barrel Corp.; Filtration Engineers, Inc.; Filtrol Co.; Foote Bros. Gear & Machine Co.; General Carbonic Co.; General Ceramics Co.; General Chromium Corp.; General Electric Co.; General Plastics Inc.; General Tank Corp.; L. W. Gibbons; Gibson & Price Co.; Gilchrist & Co.; Globe Steel Tubes Co.; Gordon-Davis Engineering Co., Inc.; Goslin-Birmingham Mfg. Co.; The Gottfried Automatic Flow Control Corp.; Grindle Fuel Equipment Co.; Gross Lead Burning & Coating Corp.; Gruendler Patent Crusher & Pulverizer Co.

Hanovia Chemical & Mfg. Co.; Hardinge Co., Inc.; Hauser-Stander Tank Co.; Hendrick Mfg. Co.; A. Huhn Mfg. Co.; Hunkins-Willis Lime & Cement Co.; C. W. Hunt Co.; Hydro Centrifugals Inc.; Industrial Chemical Sales Co.; Industrial Separator Co. Inc.; Industrial Welded Products Co.; Inert Metal Products Inc.; International Nickel Co., Inc.; International Paper Co.; John Johnson Filter Press Corp.; Karolith Corp.; Kasebier-Chatfield Shellac Co.; Kewaunee Mfg. Co.; Karl Kiefer Machine Co.; The Koppers Co.; L. O. Koven & Brother, Inc.; Kuttroff-Pickhardt & Co.; Laughlin Filter Co.; Lead Lined Iron Pipe Co.; The Liquid Carbonic Corp.; Louisville Drying Machine Co.; Ludlum Steel Co.; The Luzerne Rubber Co.; MacNair - Dorland Co.; Magnetic Mfg. Co.

The Matheson Co.; Merck & Co., Inc.; Merco Nordstrom Valve Co., Inc.; Metasap Chemical Co.; The Miner Laboratories; Mixing Equipment Co.; Monarch Mfg. Wks., Inc.; The Moto Meter Co. Inc.; National Oil Products Co.; Nation Rosin Oil & Size Co.; Nelson-Miller Corp.; Niagara Alkali Co.; Northern Pump Co.; Norton Co.; Parks-Cramer Co.; Pfaltz & Bauer; The Pfaudler Co.; Philadelphia Quartz Co.; Pneumatic Scale Corp.; Proctor & Schwartz, Inc.; The Productive Equipment Corp.; Resisto Pipe & Valve Co.; Richardson Scale Co.; Robinson, Butler, Hemingway & Co., Inc.; Roessler & Hasslacher Chemical Co.; Selden Company; Sharples Solvents Corp.; T. Shriver & Co.; A. O. Smith Corp.; Spraco Inc.; Spray Engineering Co.; Spring Stopper Co.; Sterling Products Co.; F. J. Stokes Machine Co.; Swenson Evaporator Co.; Tennessee Eastman Co.; Triangle Package Machinery Co.; United Chromium, Inc.; United Lead Co.; United States Rubber Co.; U. S. Stoneware Co.; Vallez Rotary Filters; Vanadium Corp.; Westvaco Chlorine Products Co.; Whiting Corp.; Willson Products, Inc.

H. J. Baker & Bro. Reorganizes

H. J. Baker & Bro., New York, announces that owing to the death of Frank Morse Smith, the co-partnership existing between the latter and Edward A. Buck, James K. Welsh, Charles D. Rafferty and Henry V. B. Smith has been dissolved and a new co-partnership formed by the four surviving partners. The new firm will operate under the same name and will continue the business and assume the liabilities of the old firm.

In application of Semet-Solvay Co. for registration of "Semet-Solvay Coke" as trade-mark, the latter was held registerable, the words "Semet" and "Solvay" not being considered as an individual name and a geographical term, respectively, in view of the fact that only one instance of the use of each for the purpose stated was cited. This reverses a decision of the Examiner of trade-marks.

Cook, Swan & Young Corp. is sold to Gilbert P. Smith and J. Howard Smith, former president and director, respectively, of the firm, by direction of the Federal Court at Newark, N. J., in accepting their bid of $245,000 for the company's assets. This ends the receivership action brought by minority stockholders who claimed mismanagement.

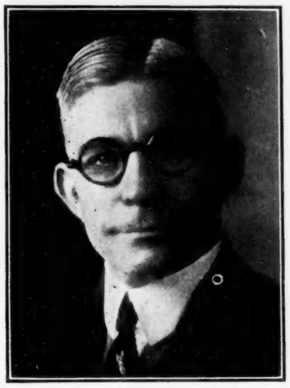
Monsanto Chemical Works is participating in a group insurance program under a plan of the Metropolitan Life Insurance Co. which combines $1,225,000 life insurance with approximately $1,225,000 of accidental death and dismemberment protection.

W. L. Richeson & Sons, New Orleans, freight brokers, announces the opening of an office in Memphis, with Charles B. Bowling as vice-president and manager.

American Chemical Society Holds Two Symposiums at 27th Meeting

General Meetings Discuss "Economic Relations Between Chemistry and Farming" and "Molecular Structure" —Dr. Garvan Awarded Priestley Medal.

American Chemical Society holds its seventy-seventh meeting at Columbus, Ohio, April 29-May 3. Following registration, a council meeting, dinner, reception and informal dancing on Monday, April 29, the meeting got actively under way on the morning of April 30 with two general meetings.



Louis J. Taber
Master of the National Grange

A symposium on "Economic Relations Between Chemistry and Farming," Williams Haynes Chemical Markets, chairman, was the feature of the general meeting of Group A, held under the auspices of the Division of Industrial and Engineering Chemistry, at the Neil House. At that time, Louis J. Taber, Master of the National Grange addressed the meeting on "What Agriculture Needs of Chemistry." He was followed by Major T. P. Walker, Commercial Solvents Corp., on "The Farm as a Producer of Chemical Raw Materials," and by C. H. MacDowell, Armour Fertilizer Works, on "The Farm as a Consumer of Chemicals."

"Molecular Structure" was the subject of the symposium for the general meeting of Group B, which with Victor K. LaMer, Columbus University as chairman, met under the auspices of the Division of Physical and Inorganic Chemistry, in the Chamber of Commerce Auditorium. The speakers were Irving Langmuir, General Electric Co., on "Interfacial Surface Energies"; F. M. Jaeger, Cornell University, on "The Constitution and Structure of Ultramarines"; and G. W. Stewart, University of Iowa, on "X-Ray Studies of Liquids." Discussion was lead by George L. Clark.

The afternoon was given over to divisional meetings, while in the evening, an illustrated lecture was given by Julius F. Stone on "The Grand Canyon of the Colorado River." This was followed by a smoker and entertainment in the Neil House.

Both morning and afternoon of Wednesday, May 1, were given over to divisional meetings. Luncheon was held at Ohio State University and at four o'clock there was a review of the R. O. T. C. Brigade in honor of Irving Langmuir president and the other officers of the society. Group dinners were held in the evening and these were followed by a lecture in the Memorial Hall, by C. E. Kenneth Mees, on "The Formation of the Photographic Image," illustrated. Dr. Mees also presented, through the courtesy of the Lick Observatory, a film showing the rotation of Jupiter.

Thursday morning was also given over to divisional meetings with adjournment at twelve o'clock to Battelle Memorial Institute, where the members of the society were guests at a luncheon given by trustees of the institute. In the afternoon the members went on various industrial trips leaving from the institute. Friday, May 3, was also devoted to visiting industrial plants in Dayton and other cities.

Divisional meetings were all held in the Chemical Building, Ohio State University. The various groups participating were as follows: Division of Agricultural and Food Chemistry, F. C. Blanck, chairman H. A. Schuette, secretary; Biological Chemistry, M. X. Sullivan, chairman, D. Breese Jones, secretary; Cellulose Chemistry, J. L. Parsons, chairman, C. J. Staud, secretary; Chemical Education, W. McPherson, chairman, R. A. Baker, secretary; Colloid Chemistry, F. E. Bartell, chairman, R. A. Gortner, secretary; Gas and Fuel Chemistry, S. P. Burke, chairman, O. O. Malleis, secretary; History of Chemistry, L. C. Newell, chairman, T. L. Davis, secretary; Industrial and Engineering Chemistry, R. J. McKay, chairman, E. M. Billings, secretary; Medicinal Chemistry, A. J. Hill, chairman, A. E. Osterberg secretary.

Division of Organic Chemistry, E. C. Franklin, chairman, F. C. Whitmore, secretary; Paint and Varnish Chemistry, P. E. Marling, chairman, E. W. Boughton, secretary; Physical and Inorganic Chemistry, V. K. LaMer, chairman, F. Daniels, secretary; Petroleum Chemistry, J. B. Hill, chairman, C. L. Johnson, secretary; Rubber Chemistry, A. H. Smith, chairman, H. E. Simmons, secretary; Sugar Chemistry, H. C. Gore, chairman, J. K. Dale, secretary; Water, Sewage and Sanitation Chemistry, S. E. Coburn, chairman, W. D. Collins, secretary.

R. & H. Platinum Works Sold

Baker & Co., assayer and refiner, Newark, acquires goodwill, machinery and metal stocks of R. & H. Platinum Works, Inc., New York and Perth Amboy, which for the past twenty-two years has been operating as a subsidiary of the Roessler & Hasslacher Chemical Co. F. A. Croselmire, formerly manager, R. & H. Platinum Works has been included in the Baker organization and will continue in charge of the department handling all matters concerning R. &. H. customers. His New York office will be at 30 Church st.

Long contested litigation over patent rights in the manufacture of soap flakes, instituted by Colgate & Co., Industrial Spray Drying Corp. and the Spray Dryer Process Corp. against Proctor & Gamble Co., is dismissed April 4, in the United States District Court of Cincinnati. Court order was issued following representation by all parties involved that a settlement had been reached outside of court.

Carbide & Carbon Chemicals Corp.'s suit against Texas Co. for alleged infringement of patents relating to manufacture of natural gasoline from natural gas is dismissed by the United States Court of Appeals for the Fifth Circuit Court, held all claims of patents 1,465,598, 1,429,175 and 1,523,314 were invalid for want of invention and for anticipation.

Kuttroff, Pickhardt & Co., New York, features a new synthetic resin, "New Pale TC," the recently announced "Soligen" driers, and "Stabilisal A," a lacquer stabilizer, at its exhibit at the Twelfth Exposition of Chemical Industries, in New York, May 6-11. C. A. Lechner is in charge of the exhibit.

Monsanto Chemical Works announces that Herbert M. Hodges is now member of the board of directors and manager of sales for Graesser-Monsanto Chemical Works, Ltd., with offices in London. Since 1919, he has been representing Monsanto in the Far East, selling in China, Japan and the Malay States.

Pitch Pine Products, Inc., Tampa, announces appointment of John J. Earle as sales manager. The latter has been associated with naval stores operations in Florida for past fifteen years.

Bolinross Chemical Co., Newark, is petitioned into bankruptcy and a receiver apppointed on complaint of Frederick G. Ross, secretary and treasurer of the company.

Commercial Solvents Corp. announces removal to the twenty-ninth floor, New York Central Building, 230 Park ave., New York.

Eastman Kodak Co. approves plan to provide retirement annuities, life insurance, and disability benefits for employees.

Freeport Texas Co. announces election of L. M. Atherton to board of directors.

Personal and Personnel

Elon Huntington Hooker, president, Hooker Electrochemical Co., criticises President Hoover's stand on the national origins plan for restricting immigration in a talk given in New York before members of the Women's Republican Committee. He is quoted as saying that "Mr. Hoover said he signed only because it was mandatory and that he didn't fully believe in it. Mr. Hoover is making a mistake. I worked for Mr. Hoover in the campaign and I think he is a wonderful President, but he doesn't know as much about immigration as some of the rest of us."

C. G. Atwater, Barrett Co.; Dr. Firman E. Bear, American Cyanamid Co.; C. J. Callister and J. N. Harper, N. V. Potash Export My.; James H. Collins, Superphosphate Institute; Sidney B. Haskell, Synthetic Nitrogen Products Copr.; J. C. Pridmore and H. R. Smalley, National Fertilizer Association; are members of the educational committee, National Fertilizer Association, appointed by Charles J. Brand, secretary of the association. H. R. Smalley is chairman of the committee.

Richard O. Loengard, vice-president, Chromium Corp. of America; William J. McIntosh, chemist, James W. Byrnes, Shellac Co.; A. L. Mullaly, director of sales, Kuttroff, Pickhardt & Co.; Hans Stauffer, sales manager, Stauffer Chemical Co.; Samuel Warren Mays, purchasing agent, and Edgar V. O'Daniel, vice-president and general sales manager, American Cyanamid Co.; are among the new members of the Chemists' Club, New York.

Don Pablo Ramirez, Chilean Minister of Finance; Raul Simon, budget officer of the finance ministry; and Jorge Silvia, chief of the nitrate division, Chilean Department of Finance, are spending about a month in this country before sailing on a European trip. The purpose of the entire journey is in the interests of the world nitrate situation and conferences with various producers, dealers and distributors have been and will be held in this country and abroad.

Charles H. MacDowell, president, Armour Fertilizer Works, Chicago, is named an Officer of the Legion d'Honneur of France. During the war he served as head of the chemical division of the War Industries Board, and attended the Versailles conference with President Wilson, as a chemical expert. He has been awarded the Distinguished Service Medal and similar decorations by other governments.

C. Harold Smith, president, Binney & Smith Co., New York, writes his autobiography, entitled "The Bridge of Life", published by D. Appleton & Co., New York, $2.70 net. In the ensuing discussion concerning some of the ideas therein expressed, he also offers a $1,000 prize to the person who will offer the best suggestion to Mr. Smith for a scientific method of disposing of $10,000,000.

Edward Mallinckrodt, Jr., president, Mallinckrodt Chemical Works, and son of the original donor of the laboratory bearing his name, is toastmaster at a dinner following the formal opening on April 8, of the Mallinckrodt and Converse Memorial to Harvard University, a $2,000,000 chemical laboratory. Charles M. A. Stine, director of research, E. I. du Pont de Nemours & Co.. was one of the speakers.

Colonel Herman A. Metz, president, General Dyestuff Corp., a Democrat and former Controller of the City of New York, is mentioned prominently as a possible nominee on a fusion ticket for mayor of that city.

Francis P. Garvan, president, Chemical Foundation, purchases two residential properties in Aiken, S. C., one at a price of $320,000 and the other at $55,000.

Manufacturing Chemists and S. O. C. M. A. to Hold Joint Meeting

Manufacturing Chemists' Association and the Synthetic Organic Chemical Manufacturers' Association will hold a joint annual meeting at the Hotel du Pont-Biltmore, Wilmington, June 6 and 7. Business sessions will be separate but there will be at least one general session and all other functions will be held jointly.

At its regular monthly meeting, in New York, April 17, the executive committee, Manufacturing Chemists' Association, passed a resolution endorsing and approving the recommendations of President Hoover in his message to Congress with reference to the flexible section of the Tariff Act.

Salmon W. Wilder, Merrimac Chemical Co., chairman of the executive committee, presided at the meeting. The following committee members attended: Henry Howard, Grasselli Chemical Co.; W. D. Huntington, Davison Chemical Co.; Harry L. Derby, Kalbfleisch Corp.; Henry Bower, Henry Bower Chemical Co.; Charles L. Reese, E. I. du Pont de Nemours & Co.; C. W. Millard, General Chemical Co.; Philip Schleussner, Roessler & Hasslacher Chemical Co.; John I. Tierney, secretary of the association.

Manufacturers' Association Submits Tariff Proposals

Harry L. Derby, president, Kalbfleisch Corp. and chairman, Tariff Committee, National Association of Manufacturers, announces that his committee has submitted proposals to Congress with regard to re-writing section 315 of the Tariff Act of 1922, which proposals differ from the present law as follows:

1. In changing the formula from ascertained differences in cost of foreign and domestic production to ascertained differences in conditions of foreign and domestic competition.
2. It removes the limitation of 50 per cent. within which the Executive may raise or lower a duty.
3. It permits removal of an article from the free list when the competitive condition threatens injury to a domestic industry and that industry is operated with reasonable efficiency. When the condition to which the executive proclamation is addressed changes or passes away, the Executive, by subsequent proclamation, may make a corresponding change.
4. It gives the executive and the commission discretion in ascertaining the basis of values, whether by invoice or by domestic prices.
5. It requires the Tariff Commission to make a recommendation in addition to an investigation.
6. It defines similar or comparable articles in terms suggested by business experience to meet technical difficulties developed by interpretation.

Canada Gypsum & Alabastine, Ltd., purchases five other concerns and other lime properties including Beachville Line & Stone Co., Beachville, Ont.; Christie Henderson Co., Ltd., Hespeler, Ont.; R. Robertson Lime Co., Milton, Ont.; Toronto Line Co., Limehouse, Ont.; and Wellington Lime Co., Toronto, Ont.

Industrial Alcohol Institute, Inc., holds meeting at Stevens Hotel, Chicago, April 11 and 12, to plan campaign for 1929-30 denatured - alcohol - for - anti-freeze season.

Freeport Sulphur Co. sells asphalt plant at Freeport, Texas, to R. J. Wilkinson, New Orleans.

Monsanto Chemical Works announces that orthochloraniline has been added to the intermediates produced by Monsanto.

Apex Chemical Co., New York, announces removal to 225 W. 34 st., that city.

News of the Companies

Monsanto Chemical Works announces that its eastern district sales office at 12 Platt st., New York, will handle sale of Graesser-Monsanto products formerly conducted by the Tar Acid Refining Corp. A separate division has been established under direction of F. T. Roberts, formerly at the London office, Graesser-Monsanto Chemical Works. Shipping and invoicing of Graesser-Monsanto products will also be handled by Monsanto.

E. I. du Pont de Nemours & Co., Inc., acquires assets of Krebs Pigment & Chemical Co., Newport, Del. Assets will be transferred to a new company to be organized under the laws of Delaware under the name of the old company. A. S. Krebs will remain as president of the new company.

Adolphe Hurst & Co., New York, is made exclusive agent for the United States and Canada for casein manufactured by Melano & Pettigrani, Buenos Aires. William Rocamora, former agent for the Argentine firm, is now manager of the casein department, Hurst & Co.

Davison Chemical Co. extends its fertilizer business into New England through purchase of Berkshire Chemical Co., Bridgeport, Conn., manufacturer of fertilizer and castor oil. Company will be operated as a subsidiary and James R. Rossman will be the Davison company's representative in Bridgeport.

Braum-Knecht-Heimann Co., San Francisco, chemicals and laboratory apparatus, on the occasion of its seventy-fifth anniversary, issues a very attractive booklet giving a history of the company and illustrated with sketches by Will Wilke.

Canadian Industries, Ltd., announces appointment of David A. Pritchard as general production manager, heavy chemical division, with offices in Toronto. He was formerly works manager, Canadian Salt Co. and is said to be an expert on production of the soda alkalis from salt by the electrochemical method.

Industrial Chemical Co., New York, issues new booklet dealing with application of activated carbons to refining oils, fats and greases and a special booklet on the recovery of dry cleaners' solvent. Copies furnished on request to the company.

Commercial Solvents Corp. publishes an attractive and well illustrated brochure, describing its plants and processes in a non-technical manner. It is designed primarily to acquaint stockholders with the company's operations.

American Commercial Alcohol Corp., together with its advertising policies as directed by the Hazard Advertising Corp., is the subject of an article in the April issue of *Class & Industrial Marketing*.

Duval Texas Sulphur Co., United Gas Co.'s sulphur producing subsidiary, makes an exclusive contract with Ashcraft Wilinson Co. of Atlanta, Ga., to handle the entire output of its sulphur mines.

Gillespie-Rogers-Pyatt Co. is formed by merger of L. C. Gillespie & Sons and Rogers-Pyatt Shellac Co. Company is capitalized at $750,000.

Grasselli Chemical Co. publishes new booklet containing list of products, plants and distribution points. Copies may be obtained upon request to the company.

Texas Gulf Sulphur Co. announces removal of offices to thirty-first floor, New York Central Building, 75 East 54st., New York.

Potash Importing Co., New York, announces removal to 10 E. 40 st., that city.

Anglo-Chilean Nitrate Plans Merger With Lautaro Nitrate

Anglo-Chilean Consolidated Nitrate Corp. and Lautaro Nitrate Co., London, plan a merger of interests, according to advices from London, J. O. Herrera, chairman of the latter company has made the following announcement: "Negotiations have taken place between representatives of the Lautaro Nitrate Co., Ltd. and the Anglo-Chilean Consolidated Nitrate Corporation looking to the introduction of the Guggenheim process into the operations of the Lautaro Co. The plan under consideration contemplates the exchange of present Lautaro shares for Lautaro preference shares, with a bonus of new ordinary shares, and that compensation to Anglo-Chilean will be entirely in the form of new ordinary shares of the Lautaro Co.; also that a new Guggenheim process plant is to be financed with Lautaro bonds. The Chilean Government has indicated that it regards the plan as being in the interest of the nitrate industry generally. Details of the plan remain to be worked out and formal agreement made, after which the proposition will be submitted to Lautaro shareholders for their approval."

The Lautaro company is the largest individual producer in the Chilean nitrate industry, with an output at present of about 25 per cent. of the total annual production, which should be increased to over 40 per cent. in a few years' time. The Anglo-Chilean produces about 15 per cent. of the Chilean output, so that a fusion of the two would eventually bring under one control over half of the Chilean nitrate industry. Both companies have reduced production costs substantially by the introduction of mechanical mining devices, and further economies are expected. The annual productive capacity of the two concerns, it is estimated, will shortly exceed 1,500,000 tons. It is understood that four Lautaro directors have recently returned to England after long negotiations with the Guggenheim interests.

American Electrochemical Program

American Electrochemical Society announces program for meeting at University of Toronto, May 27-30. On the morning of the first day, Floyd T. Taylor will lead discussion on the subject of "Electro-Magnetic Characteristics of Electrochemical Processes." In the afternoon, R. A. Witherspoon will preside over a discussion of "Canada's Electrochemical Industries;" and there will be a symposium on "Modern Methods of Teaching Electrochemistry," Prof. Roy L. Dorrance, chairman. In the evening there will be an illustrated lecture by Prof. Harry A. Curtis, Yale University, on "The Nitrogen Fixation Factories of the World," and an address with experimental demonstration by Walter von Hohenau of Brazil, on "Rearrangement of Atomic Structures Through Electro-Magnetic Vibrations."

On Tuesday morning, May 28, there will be a scientific-technical session to discuss electric furnaces, electro-reduction, corrosion, etc. This will be followed by visits to industrial plants in the afternoon and an informal smoker and entertainment in the evening. The following morning there will be a joint session with the American Electroplaters' Society to discuss electroleposition. A joint session and garden party with the Canadian Chemical Association in the afternoon and a joint dinner and dance with that association and the Canadian Institute of Chemistry will complete the day. Paul J. Kruesi, president, will address the gathering at dinner. Thursday will be given over to an all day excursion to International Nickel plant, Port Colborne.

Innis, Speiden & Co., New York, announces removal of offices on May 15 to 117 Liberty st., that city.

Parsons & Petit, New York, announces removal of offices to 26 Beaver st.

North Hudson Chemical Co., Albany, reduces capital from $250,000 to $43,260.

The Financial Markets

Du Pont Quarterly Report Shows Net of $2.42 Against $2.18 Last Year

Other Chemical Companies Report Increased Net for Quarter—Mathieson $3.15 Against $2.62—Commercial Solvents $3.80 Against $2.64—Texas Gulf Sulphur $1.52 Against $1.21.

Reports of E. I. du Pont de Nemour & Co. for first quarter of 1929, shows $23,847,677 or $2.42 per share earned on the 9,838, 675 shares of $20 par common stock as against $20,304,487, or $2.18 a share earned during the first three months of last year on 9,315,803 shares. Increase in shares outstanding represents shares issued in connection with acquisition of Grasselli Chemical Co. Net income from operations and investments for the three months was $25,239,845 compared with $21,514,198 in 1928; an increase of $3,725,647 or 17 per cent.

Earnings from operations for the first quarter of 1929, including business of Grasselli Chemical Co., were $7,442,844 as compared with $3,977,713 for the first quarter of 1928, an increase of $3,465,131, or 87 per cent. Income from company's General Motors investment was $17,466,131 compared with $14,974,930 for the first quarter of last year. Both of these figures include $9,981,220 as extra dividends paid by General Motors in January of the respective years. Income from miscellaneous securities was $1,096,119 as against $3,208,707 last year, when $2,286,000 representing profit from the sale of 114,000 shares of United States Steel Corporation common stock was included.

The surplus account was increased during the quarter by $28,981,055—from $105,710,319 at December 31, 1928 to $134,691,374, March 31, this year, of which $24,953,050 represents an increase in the value of company's investment in General Motors Corp. common stock, adjusted on the books of the company in March, 1929, from $139,737,080, to $164,690,130. On the basis of the 9,981,220 shares of $10 par value now owned, the present figure represents a valuation of $16.50 per share as compared to previous valuation of $14 per share.

Texas Gulf Sulphur Co., Inc., reports for quarter ended March 31, 1929, net income of $3,880,260 after depreciation and federal taxes but before depletion, equivalent to $1.52 a share earned on 2,540,000 shares of no-par stock. This compares with $3,087,839 or $1.21 a share in first quarter of 1928.

During first quarter of 1929, company decreased its reserves, including reserves for depreciation and federal taxes, by $157,193, making total of these reserves $11,502,006 on March 31, last. All assets subject to depreciation in connection with company's operations at Gulf, Texas, are now entirely offset in these reserve accounts.

Mathieson Alkali Works, Inc., reports for quarter ended March 31, 1929, net income of $506,675 after depreciation, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock, to $3.15 a share earned on 147,082 shares of no-par common stock. This compares with $429,463 or $2.62 a share on 147,207 shares of common in first quarter of 1928.

Commercial Solvents Corp. reports for quarter ended March 31, 1929, net profit of $844,355 after depreciation, interest, federal taxes, etc., equivalent to $3.80 a share earned on 221,996 shares of no-par stock. This compares with $575,726 or $2.64 a share on 217,722 shares in first quarter of 1928.

General Printing Ink Corp. Formed by Merger of Five Companies

General Printing Ink Corp. is formed through consolidation of five companies and makes public offering of 26,716 shares of $6 cumulative preferred stock at $98 and accrued dividends, to yield 6.12 per cent of the General Printing Ink Corp., with common stock subscription warrants. The five companies whose assets are acquired by the new corporation are the George H. Morrill Co., the Fuchs & Land Manufacturing Co., the Sigmund Ullman Co., the Eagle Printing Ink Co., and the American Printing Ink Co.

Subscription warrants attached to each share of preferred stock will entitle the holder to subscribe for one share of common stock at a price of $60 on or before April 1, 1931, and at $75 thereafter to April 1, 1934. The capitalization of the company will consist of 100,000 shares of $6 cumulative preferred stock and 400,000 shares of common stock, both of no par value, of which 45,000 preferred and 185,000 common shares will be presently outstanding. Proceeds from the issue of these stocks will be used for the retirement of $268,000 mortgage indebtedness of a predecessor company, for working capital and to acquire assets of the merged companies.

Heyden Nets $325,107 for Year

Heyden Chemical Co. reports for year ended December 31, 1928, net income of $325,107.48. It was incorrectly stated here last month that net income was $425,107. It was also stated that there are accumulated unpaid dividends on the 7 per cent. cumulative preferred stock of the company. Officials of the company state that all unpaid dividends on the preferred stock had been paid up before January 1, 1929.

A dividend of 50 cents per share has also been declared on the common stock, payable May 1,

Monsanto Plans Stock Increase

Stockholders of Monsanto Chemical Works will meet July 2 to vote on a plan to increase the authorized common stock from 160,000 to 500,000 shares, of which 125,604 are now outstanding, and to issue two shares for each share now held. If approved, the new stock will be issued July 20 to stock of record July 10. Directors propose to place the new stock on an annual dividend basis of $1.25 cash and 6 per cent. in stock. The present basis is $2.50 annually.

Westvaco Chlorine Products Corp. and subsidiaries for the quarter ended on March 31 show a net income of $301,941 after depreciation, Federal taxes and other charges, equivalent after dividend requirements on the 7 per cent. preferred stock to $1.31 a share on 200,000 no par shares of common stock. This compares with $128,584 or $1.16 a share on 100,000 common shares outstanding in the first quarter of 1928.

Freeport Texas Co. reports for quarter ended February 28, 1929, net income of $737,037 after expenses and reserves for depreciation and taxes, equivalent to $1.01 a share earned on 729,844 shares of no-par stock. This compares with $405,160 or 55 cents a share in corresponding quarter of previous year.

Air Reduction Co., Inc., for quarter ended March 31, 1929, reports profit of $1,406,194 after expenses and reserves but before federal taxes, comparing with $728,940 in first quarter of 1928. Company has outstanding 738,363 no-par shares of stock.

Tennessee Copper & Chemical Reports $1.54 Per Share for 1928

Report of Tennessee Copper & Chemical Corp. and subsidiaries for year ended December 31, 1928, shows net income of $1,267,226 after depreciation, taxes and interest, equivalent to $1.54 a share earned on 822,280 shares of no-par stock outstanding at end of year. This compares with $408,498 or 51 cents a share on 794,626 shares in 1927. Statement of Tennessee Copper & Chemical Corp. and subsidiaries as of December 31, 1928, shows total assets of $18,352,976, compared with $17,490,348 at end of 1927, and surplus of $12,143,949, against $11,101,235. Current assets were $5,668,118 and current liabilities $806,879, compared with $4,650,355 and $569,610, respectively, at end of previous year.

Newport Nets $622,313 in 9 Months

Report of Newport Co. and subsidiaries for nine months ended September 30, 1928, shows net profit of $622,313 after depreciation, federal taxes, etc. Stock outstanding consists of 130,000 $50 par class A convertible stock and 251,250 no-par common shares.

Consolidated income account for nine months ended September 30, 1928, follows: Net sales $6,012,068; costs, expenses and depreciation $5,272,384; operating profit $739,684; other income $3,404; total income $743,088; miscellaneous charges $17,625; charges on purchase money obligations $16,500; federal taxes $86,650; net profit $622,313.

Union Carbide Splits Common 3 for 1

Stockholders of the Union Carbide and Carbon Company approve an increase in the authorized capital stock from 3,000,000 to 12,000,000 shares and the exchange of three new shares for each present share held. The remaining unissued shares are to be issued from time to time at the discretion of the directors. A resolution was adopted by the directors to set aside 300,000 shares of new stock to be offered from time to time to officers and employes at terms to be arranged later.

Archer Daniels Midland declared a quarterly dividend of 50 cents on common, placing stock on $2 annual baisis, against $4 paid prior to payment of 100% stock dividend, and regular quarterly dividend of $1.75 on preferred, both payable May 1 to stock of record April 20. For six months ended March 2, 1929, company reports net profit of $640,638 after depreciation, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock to $1.03 a share earned on 480,852 no-par shares of common stock. This compares with $827,317 or $3.38 a share on 200,000 common shares in same period of previous year.

Statement of Johns-Manville Corp. and subsidiaries for quarter ended March 31, 1929, shows net profit of $1,106,089 after expenses, federal taxes, etc., equivalent after 7% preferred dividend requirements, to $1.30 a share on 750,000 no-par shares of common stock. This compares with $772,705 or 85 cents a share on common in first quarter of 1928. The 1929 figures include earnings of Celite Co., Banner Rock Products Co. and Weaver Henry Co., while those of 1928 exclude these companies.

Glidden Co. reports for five months ended March 31, 1929, net profit of $921,772 after interest, depreciation and federal tax, equivalent after allowing for dividend requirements on 7% prior preferred stock, to $1.44 a share earned on 500,000 no-par shares of common stock. This compares with $515,985 or 76 cents a share on 400,000 no-par shares in same period of previous year. March net profit after interest, depreciation and federal tax was $357,357, against $202,651 in March, 1928.

Vanadium Corp. of America declares the regular quarterly dividend of 75 cents, payable May 15 to stock of record May 1.

Imperial Chemical Industries Increases Capital to £95,000,000

Annual meeting of Imperial Chemical Industries, Ltd., approves increase in capital of the company to £95,000,000 and the immediate issue of £4,410,595 7% cumulative preference shares, par value £1, at a premium of 3s. Shareholders will have the right to subscribe at the rate of one new share for every four shares held. Issue of £6,016,857 of £1 common shares at premium of 13s 6d was also approved. Basis of subscription will allow shareholders to take up one new share for every eight shares of common stock held, plus one new share for every 16 shares of deferred stock held.

The entire issue has been underwritten by the Finance Co. of Great Britain & America, in which Imperial Chemical Industries, Ltd., and Chase Securities Corp. of New York are equal partners. Arrangements have been made with the Chase National Bank of New York to receive applications and payments, so that every facility for the exercise of rights may be given to American shareholders. Similar arrangements have been made with Canadian Industries, Ltd., of Montreal for the convenience of the Canadian shareholders.

Profit of company for year ended December 31, 1928, was £5,488,243, against £4,567,224 in 1927. Net profit after providing £275,540 for income tax and £1,000,000 for reserves, was £4,212,703, against £4,032,918 in preceding year. After payment of preference dividends amounting to £1,194,549 and interim dividend on common shares of £1,054,442, there was a balance of £1,963,712 available for 37,252,178 shares of £1 par common stock and 10,860,145 deferred shares of 10s par.

American Commercial Alcohol Announces 2 for 1 Split-Up

Stockholders of the American Commercial Alcohol Corporation approve an increase in the authorized common stock from 300,000 to 750,000 shares, together with a split-up of the stock on a two-for-one basis.

Common stockholders and holders of voting trust certificates for common stock of record April 27 will receive one additional common share or voting trust certificate for each share held. There are outstanding slightly more than 136,000 common shares and voting trust certificates.

Koppers Gas & Coke Co. for year ended December 31, 1928, reports consolidated net profit of $3,795,874 after depreciation, interest, federal taxes and other deductions, equivalent after allowing for full year dividend requirements on $20,000,000 6% preferred stock to $4.32 a share on 600,000 no-par shares of common stock.

International Combustion Engineering Corp. offers common and preferred stockholders of record April 26 right to subscribe to 50,000 shares of 7% convertible preferred stock at $100 a share on basis of one new preferred share for every 20 shares of common or preferred stock held.

Common stockholders of the Westvaco Chlorine Products Corp. of record on April 19 receive rights to subscribe at $60 a share for common stock, on the basis of one new share for each eight shares held. Rights will expire on May 20.

By-Products Coke Corp. reports for quarter ended March 31, 1929, profit of $501,680 after interest and depreciation, but before federal taxes, against $366,736 in first quarter of 1928. Company has outstanding 189,936 no-par shares of stock.

Will & Baumer Candle Co., Inc., declares the regular quarterly dividends of 10 cents on the common, payable May 15 to stock of record May 1 and $2 on the preferred, payable July 1 to stock of record June 15.

The Industry's Stocks

1929 April 30 Bid	1929 April 30 Asked	1929 High	1929 Low	1928 High	1928 Low	Sales In April	Sales Since Jan. 1	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1928	Earnings $-per share-$ 1927
								NEW YORK STOCK EXCHANGE					
121⅜	113⅞	121⅜	95⅛	99⅝	59	80,300	281,400	Air Reduction	No	683,873	$2.00	9 mo. 3.70	10.74
284	280	305¾	241	252¾	146	38,600	305,800	Allied Chem. & Dye	No	2,178,109	6.00		10.03
...	...	124	120¼			3,400	10,800	7% pfd.	100	392,849	7%		62.59
...	...	23⅜	14½	26	15⅝	18,100	105,400	Am. Agricultural Chem.	100	333,221	...		1.59
55⅞	54¾	73¾	53¼	79⅞	55⅝	8,700	65,400	pfd.	100	284,552	...		7.86
144¼	139½	144¼	107¾	117½	70½	1,824,000	4,725,400	American Can	.25	2,473,998	3.00		4.11
141	141	141⅞	140⅝	147	136¾	5,400	15,300	pfd.	100	412,333	7%		31.66
60	59	81¾	55½	63¾	39	38,100	1,094,400	American Metal, Ltd.	No	595,114	*3.00	9 mo. 2.30	3.64
117	117	135	117	117½	109	1,100	18,600	pfd	100	99,907	6%	9 mo. 18.92	50.27
109½	105½	124¾	93½	293	169	245,600	1,672,600	American Smelt. & Refin.	100	609,980	4.00	6 mo. 10.61	19.64
136½	136½	138	135¼	142	131	3,500	13,400	pfd.	100	500,000	7%	6 mo. 16.44	30.96
36½	33	49¼	30⅜	57	6⅝	55,100	402,200	Amer. Zinc & Lead	25	193,120	...		...
...	...	111¼	96	117⅞	40	4,300	28,800	pfd.	25	96,560	...		d2.72
146⅜	142¼	174⅞	115¼	120¼	53¾	1,846,200	12,288,600	Anaconda Copper Mining	50	3,302,817	6.00		3.37
37¾	37	49½	36¼	112⅞	55¼	19,500	233,200	Archer Dan. Mid.	No	213,712	4.00	7.34	5.77
...	...	115	114			200	1,220	pfd.	100	43,000	7%	16.94	37.39
...	...	115	90	114	63	6,300	56,300	Atlas Powder Co.	No	261,438	4.00	6.30	5.75
102	102	106½	100	110½	102	190	2,070	pfd.	100	90,000	6%	6 mo. 10.83	22.71
66⅝	64¼	68	53½	66½	50	691,700	2,159,700	Atlantic Refining	25	500,000	1.00	9 mo. 21.72	1.83
7½	7⅜	9½	6⅛	12¼	4⅛	29,000	195,100	Butte Copper & Zinc	5	600,000	...		0.10
8¾	8½	12⅜	8⅜	16¾	8¾	9,000	87,600	Butte Superior Mng.	10	290,198	2.00	9 mo. 0.16	0.94
122¾	119¾	129¾	104¼	122	65	26,500	95,600	By Product Coke	No	189,936	*5.00	9 mo. 5.78	5.68
2⅝	2½	4	2½	5⅜	1¾	24,200	163,100	Calla Lead & Zinc	10	724,592	...	9 mo. ...	0.10
46¾	45½	61⅞	42⅛	47⅜	20½	170,600	1,615,400	Calumet & Hecla	25	2,005,502	2.50	9 mo. 0.95	0.29
22¾	22¼	28⅝	16½	119	61½	27,900	90,900	Certainteed Prod.	No	400,000	...	9 mo. ...	5.31
...	...	81½	47½	63½	23½	900	4,200	7% pfd.	100	62,904	7%	9 mo. 0.87	56.80
104	104	127½	71½	74⅞	37⅜	30,600	1,326,500	Chile Copper	25	4,415,497	3.00	6 mo. 1.96	2.51
154⅝	147	154⅞	121¼	134¾	79	37,600	218,500	Columb Carbon	No	402,131	...	9 mo. 5.24	4.83
360	344	360	225¼	250½	137⅞	60,600	209,900	Commercial Solvents	No	217,722	8.00	13.19	9.25
76	74½	80⅛	60	64⅜	53	350,400	1,469,000	Cont. Can	No	1,420,000	5.00		7.21
...	...	126	124¾	128	123	600	1,860	pfd.	100	51,125	7%		86.82
100¾	97½	101⅞	82	94	64⅝	282,400	488,700	Corn Products	25	2,530,000	2.00	9 mo. 3.00	3.50
141½	141½	144¾	141¼	146¾	138½	2,410	6,040	pfd.	100	250,000	7%	9 mo. 35.63	42.40
59¾	56½	69⅛	49	68¾	34⅝	86,100	775,200	Davison Chem.	No	480,000	...		6.21
54¼	54¼	64⅞	52	61	40	10,500	88,000	Devoe & Rayn A	No	110,000	2.40	6 mo. †5.95	†5.03
115	115	115½	112	120	108	80	1,140	1st pfd.	100	17,473	7%	6 mo. 34.71	53.23
117¼	117¼	119	115¾	121½	114	6,900	18,500	Dupont deb.	100	904,539	6%	9 mo. 57.79	57.03
181	178	198½	155¾	503	310	69,800	407,100	Dupont de Nemours	No	2,661,658	*14.75	20.89	15.45
179¾	179¾	194½	170	194½	163	10,600	82,500	Eastman Kodak	No	2,057,560	*8.00		9.61
...	...	128	126	132½	123½	400	1,150	pfd.	100	61,657	6%		326.68
...	...	310	225	230	120	500	5,200	Fed. Mining & Smelting	100	50,400	...		23.36
68	65⅛	84⅜	68⅛	89⅝	65	145,000	686,900	Fleischmann	No	4,500,000	*5.00	9 mo. 3.24	4.30
45	44¼	54⅞	38	109¾	43	48,600	381,500	Freeport Texas	No	729,844	4.00	4.49	5.12
75½	74¼	81½	61	94⅞	141½	82,900	228,800	General Asphalt	100	206,887	...	6 mo. ...	4.74
116½	115	120¼	104½	150	132	4,100	17,000	pfd.	100	68,742	5%	6 mo. d5.09	19.34
49¾	48½	50½	36⅞	37	20⅝	160,700	608,500	Glidden Com.	No	500,000	*2.00	3.37	2.88
...	...	106⅛	103½	105	95	680	3,600	prior pfd.	100	69,167	7%	32.69	23.91
64⅞	63⅝	82	54¼	143½	71	370,300	2,456,900	Gold Dust	No		2.50		8.97
72	71	79½	65½	84	64⅛	9,000	44,900	Household Prod.	No	575,000	*4.00	6 mo. 2.64	5.22
...	...	17⅞	12½	20⅞	13	11,500	61,800	Intern. Agri.	No	450,000			1.34
...	...	88½	75	85	48⅝	800	9,400	pfd.	100	100,000	7%		13.03
50⅞	48⅛	72¾	40½	46	41⅛	1,162,000	7,934,600	Intern. Nickel	No	1,673,384	3.00	9 mo. 4.72	3.30
...	...	63	51⅝	60	47¾	5,900	48,900	Int. Print Ink	No	256,022	2.50	6 mo. 2.58	4.98
80	80	90¾	55½	69	49½	1,260	12,730	Intern. Salt	100	60,771	...	6 mo. 0.05	5.38
184	179½	242¾	155¼	202	96½	184,600	1,440,100	Johns-Mansville	No	750,000	3.00	9 mo. 4.94	4.78
88½	85⅞	113⅞	71⅝	124½	63½	62,600	259,600	Liquid Carbonic Corp.	No	125,000	4.00	7.05	5.90
37½	37¼	46	37	57¾	45	3,100	19,500	Mac and Forbes	No	378,500	*3.50	9 mo. 2.34	3.62
51¾	51½	52⅝	50	190	117¾	15,680	46,080	Mathieson Alk.	No	147,207	6.00	9 mo. 9.54	10.93
...	...	125	120	130	115	250	1,210	pfd	100	24,750	7%	9 mo. 63.03	74.06
47	45¾	54½	30½	33	17¾	172,200	1,113,600	Miami Copper	5	747,116	2.00		1.53
51¾	48⅝	55½	33	58½	29¼	160,900	517,600	National Dist. Prod.	No	168,000	...		...
84½	83⅞	86½	67½	...	...	12,300	74,500	pfd. tem. ctfs.	...	...	...		...
140	140	173	132	136	115	5,400	118,300	National Lead	100	309,831	5%		8.90
45¾	45¾	48½	43			5,200	5,800	Newport Co.	50	130,000			
54½	52¼	57½	38	41½	22⅝	70,600	367,300	Penick & Ford	No	433,773	...	9 mo. 1.32	1.76
264½	262½	287½	208	217	157	7,000	68,700	Peoples Gas Chi.	100	511,521	8%	9 mo. 8.98	10.81
33⅝	32¾	43½	30			537,900	626,700	Royal Baking, new com	100	800,000	1.00	6 mo. 0.53	1.14
...	...	103⅜	99½			200	1,000	pfd.	100	100,000	6%	6 mo. 7.26	15.11
73½	69¾	94	62	71½	37	68,400	1,572,900	St Joseph Lead	10	1,950,509	*3.00		2.06
59⅛	57⅝	61½	48	59⅝	37¾	1,170,600	2,960,300	Standard Oil Co. of N. J.	25	24,419,219	*1.50		1.52
43½	42¼	45¾	38	45½	28¾	675,000	3,001,000	Standard Oil Co. of N. Y.	25	17,118,931	1.60		0.67
20⅛	19⅝	20¾	16	19⅞	10½	50,800	510,400	Tenn. Cop. & Chem.	No	794,626	1.00		0.51
83¾	81¼	85¼	72½	82½	62⅛	801,000	2,095,200	Texas Gulf Sulfur	No	2,540,000	4.00	5.72	4.76
247¼	242¼	247¼	196½	209	186⅛	164,700	1,359,100	Union Carbide	No	2,742,072	6.00	9 mo. 7.16	9.53
171	164¾	171	128	138	102⅛	178,200	614,800	U. S. Ind. Alc.	No	240,000	6.00	6 mo. 3.90	7.26
...	...	127	124½	125⅞	118⅝	20	830	pfd.	100	60,000	7%	6 mo. 19.12	36.03
97⅝	94½	116½	83¼	111½	60	112,800	963,700	Vanadium Corp.	No	376,637	*4.00	6 mo. 2.57	4.97
16¾	16⅝	24¾	15⅛	20⅝	12	26,500	396,200	Virginia Car. com.	No	486,700	...	0.69	...
53	52⅝	65½	50	64¼	44⅝	9,800	81,720	6% pfd.	100	213,392	...	7.57	d5.41
...	...	97½	89	99½	88½	1,500	6,700	7% pfd.	100	125,000	7%	20.09	d1.70
High	Low							NEW YORK CURB					
...	...	23	16	31½	16½	900	7,300	Acetol Prod.	No	60,000	2.40		8.69
38⅝	37½	43½	32	42⅝	33½	1,500	14,600	Agfa Ansco	No	300,000	...		
235	215½	235	146	197¾	120	13,300	39,700	Aluminum Co. of America	No	1,472,625	...		3.28
107	106½	107	103½	110½	104	2,700	9,900	pfd.	100	1,472,625	6%		9.28
88¾	87½	90	74	87⅞	74	24,200	64,200	Amer. Com. Alc.	No	77,000	...	3 mo. 2.66	...
61⅞	57½	61⅞	53⅜	65	30⅜	33,500	422,800	Amer. Cyan.	20	428,465	8%	†3.67	†2.92
...	...	...	...	24	13		14,600	Amer. Rayon Prod.	No	123,500	...	15 mo. ...	
29½	29½	40⅝	26½	28¼	11⅝	6,500	119,100	Amer. Sol. & Chem. com	No	160,000	...	1.58	0.07
49	47½	55⅞	46⅞	47⅞	25¼	2,800	57,800	pfd.	No	100,000	...	6.52	3.17
39⅞	39½	45⅝	33	54	26½	9,500	82,700	Anglo Chile Nitrate	No	1,756,750	...	6 mo.. ...	...
7½	7¼	8⅞	4⅝	33¾	7	17,200	62,600	Br. Celanese	No	2,650,000	...	0.55	...
39	35	43	33	46½	41	100	1,100	Canad. Ind. Alc.	No	1,092,915	1.52	†2.87	†2.49
...	...	267	180	226	156	70	3,990	Casein Co.	100	21,196	*9%		7.98
43½	42½	57½	41½	103	36½	9,600	68,700	Celanese Corp. of Am.	No	1,000,000	...		1.72
40½	40	50	40	122	34	1,000	4,100	Celluloid Co.	No	194,952	...		0.87
110	101	110	100	132	103½		2,000	1st pfd.	No	23,882	7.00		11.94
...	...	...	...	97½	75		600	7% pfd.	No	24,551	7.00		9.96
...	...	...	...	73¾	49		2,360	Celotex pfd.	100	52,532	7%	26.28	15.55
100	80	100	66½	92	75	6,500	27,300	Colgate-Palmolive Peet			2.00		
				...	...			Courtaulds	£1	12,000,000	22½%		26.55%
...	...	25½	18⅝	24⅞	20	5,100	27,200	Am. dep-rects	...	...	...		...

1929 April 30 High	Low	1929 High	Low	1928 High	Low	Sales In April	Since Jan. 1	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1928	1927
...	...	130	96¾	380	192	410	2,140	Hercules Powder	No	147,000	14%	22.04	16.35
...	...	121¾	115	125	118½	190	740	pfd	100	114,241	7%	9 mo. 24.69	28.02
...	...	30	19½	23	7½	2,900	7,700	Heyden Chem	10	150,000	...		1.0
...	...	...	...	98	38½	200	1,400	Monroe Chem					
...	...	130	125¼	...	...	200	400	Monsanto Chem	No	110,000	2.50	9 mo. 6.30	6.11
...	...	...	...	...	...	50	400	Penn Salt	50	150,000	5.00	8.27	8.09
8¼	8¼	9¼	7	9⅞	6¼	4,400	25,800	Pyrene Mfg	10	219,470	.80		0.70
90	89¾	90	81	...	...	775	1,860	Sherwin Williams	20	594,445	4.00	6.99	6.42
39⅞	39	48½	23½	111½	103	60,100	367,900	Silica Gel	No	600,000	...		
...	...	6½	4½	92	65⅞	1,200	2,600	Snia Viscosa	120 lire	8,333,333	...		3 01 lire
...	...	...	...	29	17	700	900	dep-recpts	...	...	...		...
...	...	...	...	9⅞	6¼		29,000	Spencer Kellogg	No	500,000	1.60	3.59	2.37
...	...	139½	129	10	5⅞	1,650	17,300	Swift & Co.	100	1,500,000	8%	9.87	8.13
380	370	595	365	42	31½	585	8,985	Tubize "B"	No	78,858	10.00		
46⅞	46	61½	44	150½	125	11,200	24,900	United Chem., pfd	50	120,000	3.00		
...	...	115	100	630	450	4,100	186,300	com	No	102,000			
61⅜	61½	73	56	100	53⅜	10,000	166,900	U. S. Gypsum	20	691,502	1.60	6 mo. 4.42	10.08
88	88	116½	47¾	...	...	16,600	16,700	Westvaco Chlorine Prod	No	200,000	2.00	3.60	
								CLEVELAND					
244	239	244	135	147½	104	546	3,299	Cleve-Cliff Iron	No	400,000	4.00		9.74
278	275	278	200	225	112½	157	598	Dow Chem	No	120,000	6.00		
107½	107½	107½	107½	107	103⅞	...	199	pfd	100	30,000	7%		
...	...	...	...	...	...	3,167	3,187	Glidden	No	500,000	*2.00	3.37	2.88
...	...	105	103	104¾	96	256	1,406	prior pfd	100	69,167	7%	32.69	23.91
90	89	90	82	95	65½	1,794	5,143	Sherwin Williams	25	594,445	4.00	6.99	6.42
107	107	108	104½	109½	106	744	2,510	pfd	100	125,000	6%	39.21	37.82
...	...	23¾	20¼	28	24¾	115	1,545	Wood Chemical Prod. "A"	No	20,000	2.00		7.75
								CHICAGO					
...	...	26½	16½	96	91¼	550	16,955	Monroe Chem	100	167,500	...		4.74
150	146	150	104	146	127½	8,327	24,327	Monsanto Chem	No	110,000	2.50	9 mo. 6.30	6.11
130	129	140	129	...	..	3,850	21,620	Swift & Co.	100	1,500,000	8%	9.87	8.13
62	61½	72½	55	...	...	9,150	28,800	U. S. Gypsum	20	691,502	1.60	6 mo. 4.42	10.08
46	46	60⅞	45	100	55	2,050	50,400	United Chemicals, pfd	50	120,000	3.00		
								CINCINNATI					
...	...	...	...	...	...	27	104	Fleishmann pfd	100	12,200	6%	9 mo. 1,197.09	1,589.49
349½	349	375	279	300	249	2,292	17,191	Proc. & Gam	20	1,250,000	8.00	11.96	11.38
								PHILADELPHIA					
...	...	97½	92	109½	92	500	5,400	Penn. Salt	50	150,000	5.00	8.27	8.09
190¼	186⅜	195¼	157	173½	114¼	182,400	1,045,185	United Gas Imp	50	3,903,791	6.00		6.28
								MONTREAL					
12	12	...	...	...	...	2,280	28,599	Asbestor Corp	No	200,000	...		0.87
36½	36	...	...	...	...	631	7,050	pfd	100	74,564	7%		9.32
35½	35½	...	...	..	...	10,299	119,508	Canada Ind. Alc	No	1,092,915	1.52	†2.87	†2.49
77¾	75¼	...	...	...	...	58,936	205,539	Shawinigan W. & P.	No	1,844,700	2.00		2.41
								BALTIMORE					
...	...	43	24	28¾	17	20	5,087	Silica Gel	No	600,000	...		
Bid	**Asked**							**UNLISTED**					
85	82	...	...	80	70			Agfa Ansco, pfd	100	50,500	...		...
116	112	...	...	375	190			Hercules Powd., com	No	147,000	14%	9 mo. 15.10	16.36
77	74	...	...	82	64			Merck. & Co., pfd	100	33,950	...		...
...	...	...	...	169	116			Newport	1	929,498	...		0.19

*Includes extra dividends. †Class A and class B shares combined. d Deficit.

The Industry's Bonds

1929 April 30 High	Low	1929 High	Low	1928 High	Low	Sales In April	Since Jan. 1	ISSUE	Date Due	Int. %	Int. Period	Orig. (1) Offering $
								NEW YORK STOCK EXCHANGE				
...	...	106½	104	106¾	104	78	399	Am. Agri Chem	1941	7½	F. A.	30,000
95¾	95¾	96½	93¾	97	92	71	585	Amer. Cyanid	1942	5	A. O.	
101¾	101¼	102	100	102⅞	99⅞	388	1,062	Am. Smelt & Refin "A" 5%	1947	5	A. O.	...
97	96	100	94½	105½	92	155	1,583	Anglo Chilean	1945	7	M. N.	16,500
100⅞	100⅞	102½	100	103¾	99⅞	121	388	Atlantic Refin	1937	5	J. J.	15,000
...	...	102	100	103½	100	29	111	By product Coke	1945	5½	M. N.	8,000
...	...	103	99½	103⅛	100	6	16	Corn Product Refin	1934	5	M. N.	10,000
104½	104½	109½	103	117	106	94	271	General Asphalt	1939	6	A. O.	5,000
90⅞	90⅞	95	90¾	95⅞	89½	4	32	Int. Agric. Corp	1932	5	M. N.	30,000
...	...	81½	77½	86¼	77	2	38	Int. Agri. Corp. stamped. extended	1942	5	M. N.	7,020
...	...	127	111½	...	...	49	1,074	Montecatini	1937	7	J. J.	
...	...	95¾	93	...	...	149	1,033	Ex War	1937	7	J. J.	
...	...	113	111½	...	...	36	39	People's Gas & Coke	1943	6	A. O.	10,000
...	...	105¾	101⅞	108⅛	102	56	230	Refunding	1947	5	M. S.	40,000
102⅜	102⅜	103⅜	100¾	104	102	459	1,734	Standard Oil N. J	1946	5	F. A.	120,000
115	106¼	115	102	120	101⅛	19	335	Tenn. Cop. and Chem	1941	6	A. O.	3,000
...	...	82	74	91⅞	82	10	54	Va. Iron C. & C.	1949	5	M. S.	
								NEW YORK CURB				
101½	101⅛	102½	100	103½	100	288	1,198	Alum. Co. of Am 52	1952	5	M. S.	
				121½	98		1,171	Amer. Com. Alc.	1943	5	M. N.	
114	113⅞	122	114	125	99	40	1,316	Amer. Solv. & Chem.	1936	6	M. S.	
...	...	100½	98	101¾	97½	236	1,301	Koppers Gas and Coke	1947	5	J. D.	25,000
99½	99	101	98¼	103½	98	10	137	Natl. Dist. Prod	1935	6½	J. D. 15	3,500
94¼	94	94½	91¾	98⅞	93⅜	79	594	Shawinigan W & P	1967	4½	A. O.	
...	...	112¼	101	106⅞	100	17	163	Silica Gel. 6½% with warr.	1952	6½		
...	...	98⅞	94½	100	95	43	178	Solvay Am. Invest. Corp.	1942	5	M. S.	15,000
99¾	99½	100¼	98⅜	101½	99⅜	247	1,065	Swift & Co.	1932	5	A. O.	50,000
...	...	104	99½	104	99⅜	43	233	Westvaco Chlorine Prod	1937	5½	M. S.	2,500

I. G. Markets New Soligen Driers

I. G. Farbenindustrie A. G., is marketing driers which claim to possess far greater drying powers than the resinates and linoleates. For these driers the I. G. uses an organic acid which can combine chemically with considerably greater amounts of metal than the prevalently employed resinic and linoleic acids. According to recent investigations the acid residue to which the metal in question is bound, also plays an important role in the drying. The Soligens contain no free acid, are entirely free from resins, always have the same metallic content and consequently exhibit uniform drying action. These Soligen driers, which are furnished in solid and liquid form, are finding extensive use in the varnish and lacquer, oilcloth, artificial leather, printing ink and electrical insulating industries.

Soda ash bearing the trade mark of "Red Triangle," is manufactured from salt by the Yung Li Soda Manufacturing Co. The company is located in Tongku, with a yearly output of 30,000 tons. Besides a large amount consumed on the home market, large quantities are exported to Japan through Dairen.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of Chemical Markets, published monthly at Pittsfield, Mass., for April 1, 1929
State of New York, County of New York—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Williams Haynes, who, having been duly sworn according to law, deposes and says that he is the Publisher of the Chemical Markets, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Williams Haynes, 25 Spruce St., New York, N. Y.; Editor, none; Managing Editor, Elmer F. Sheets, 25 Spruce St., New York, N. Y.; Business Manager, William F. George, 25 Spruce St., New York, N. Y.
2. That the owner is: (If the publication is owned by an individual his names and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent. or more of the total amount of stock should be given.) Williams Haynes.
3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company a trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.
5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

Williams Haynes, Publisher.

Sworn to and subscribed before me this 15th day of April, 1929. J. Oscar Fischer (My commission expires Notary Public, N. Y. Co. Clerk's No. 474 N. Y. Reg. No. 0-558, March 1930.)

(Seal.)

The Trend of Prices

Increase in Production and Trade Feature Month in Industry

Industrial Activity Continued At A High Rate During April — Chemical Markets Generally Have Been Marked By An Increasingly Stronger Tendency Since First Of Year—Chemical Business Steady And In Good Volume.

Featuring business situation during March was a general increase in industrial production and trade, with wholesale prices advancing somewhat, while industrial activity continued at a high rate the first part of April, although there was a slowing down in certain branches of the steel industry and a smaller output of coal and petroleum, according to the Federal Reserve Board.

Output of manufactures reached a new high level in March. Automobile production was exceptionally large, and steel ingot output was reported to be above rated capacity. Output of refined copper, lumber, cotton and silk textiles and sugar was also large for the season. There was some seasonal recession from February in the production of wool textiles and leather, and a further decline in production by meat packing plants. The volume of factory employment and pay rolls continued to increase during the month and was substantially above the level of March 1928.

"Production of minerals as a group declined sharply, reflecting reduction in output of coal by more than the usual seasonal amount. Output of non-ferrous metals continued large and petroleum production increased.

"The value of building contracts awarded increased seasonally during March and the first two weeks in April reflecting in part the award of a few large contracts, chiefly commercial and industrial. The total volume of building, however, continued smaller in March than a year ago. Contracts for residential building and public works and utilities were substantially below the level of March, 1928, while industrial and commercial building was in larger volume.

"Railroad shipments of commodities declined somewhat in March, but were larger than in the same period of the preceding year. The decline from February reflected smaller shipments of coal and coke, grain products and live stock, all of which were also below March a year ago. Loadings of ore and miscellaneous freight increased substantially over February and continued above 1928.

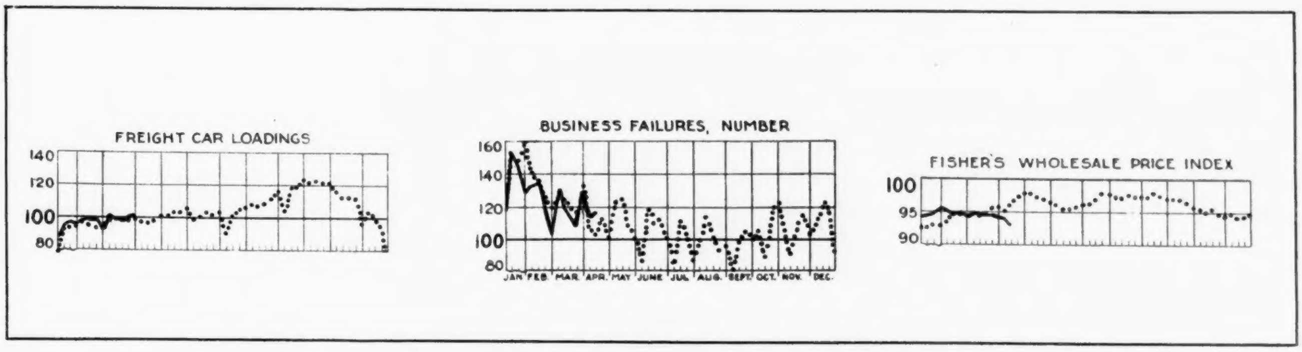
"Wholesale prices of commodities during March averaged slightly higher than in February, according to the index of the United States Bureau of Labor Statistics. There were marked increase in prices of copper and lead, and smaller advances in prices of iron and steel and cotton goods, as well as of certain agricultural products, particularly cotton, live stock, meats and hides. Prices of grain and flour were lower during the month and the price of leather declined, reflecting an earlier decline in prices of hides. Silk and rayon textiles and raw wool were also somewhat lower in price.

"In the middle of April prices of live stock and raw silk were higher than at the end of March, while cotton and wool had declined in price. Among the nonagricultural products there were marked declines in the prices of copper, lead, tin and zinc; a further decline in rubber and increases in pig iron and finished steel."

Perhaps the outstanding feature of the past month in the chemical trade has been the formation of the American I. G. The effect upon markets and prices will be watched with interest but the chief reaction at present seems to be one of curiosity to see just what the organization may do now that it is on a comparable basis with American producers, both as regards labor and raw material costs.

The markets generally are in splendid condition. There seems to be no doubt that the tendency has been gradually stronger since the first of the year. Nothing very spectacular has occurred and business has been proceeding in steady fashion under healthy conditions.

The new alcohol prices, of course, attracted considerable interest, but they were more or less expected. The alkali group is in the best shape it has been for the past five years. Acetic acid, formaldehyde, phenol and formic acid continue to be in rather short supply. The mineral acids lead by sulfuric are if good demand. Copper sulfate has apparently returned to normal. The fertilizer season is opening slowly and at present sodium nitrate is the strongest member of the group. This is probably due in large measure to the centralization going on within the industry combined with the real efforts of the Chilean Government to aid the producers.



Business indicators prepared by the Department of Commerce. The weekly average 1923-1925 inclusive = 100. The solid line represents 1929 and the dotted line 1928.

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

Acetone — Has been in steady, good demand during the past month with the market well maintained despite increased production. The rayon industry continues to make heavy demands while continually increasing quantities are said to be moving into oil refining fields.

Acid Acetic — Continues in excellent demand, with the movement into consuming channels proceeding as rapidly as the material is produced. Demand from the ethyl acetate field is not quite so heavy but the rayon industry continues to be a heavy consumer. Calcium acetate comes in in only limited supply and thus prevents any big increases in production.

Acid Citric — Despite rumblings from abroad and increased costs of foreign raw materials, the domestic market remains steady and firm with no evidence of any price advances. A recent report on the Italian citric products market states that the Camera Agrumaria has fixed the selling price of citrate of lime at 600 lire per 100 kilogs on the usual 64 per cent. citric acid basis. The Camera is not disposed to make sales however and there seems good reason to belive that a further rise in selling prices will be made.

Acid Sulfuric — Leading the mineral acids, this member continues firm and in heavy demand. Despite the fact that production is heavier than ever before, difficulties are reported in some sections of the country, in keeping up with demands.

Acid Tartaric — Demand has increased somewhat and raw material costs are reported to be on an upward trend, so that the market is very firm.

A recent report on the Italian tartaric products market states that the Camera Agrumaria has fixed the selling price of citrate of lime at 600 lire per 100 kilogs on the usual 64 per cent citric acid basis. The Camera is not disposed to make sales, however, and there is good reason for believing that a further rise in selling prices will be made. since tartaric acid itself is now selling at 1,950 lire per 100 kilogs f.o.b. Palermo. It is understood that stocks of citrate of lime, which are of long-standing, in the hands of the Camera amount to 10,200 tons. This year's production does not exceed 5,000

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.26	.18½	.24	.24	Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21	.21	.18½
				Acetaldol, 50 gal dr..........lb.	.27	.31	.31	.27
.24	.23	.20	.20	Acetanilid, tech, 150 lb bbl...lb.	.23	.24	.24	.23
.35	.29	.29	.29	Acetic Anhydride, 92-95%, 100 lb cbys..................lb.	.29	.35	.35	.29
.....	.....	.38	.32	Acetin, tech drums..........lb.	.30	.32	.32	.30
.15	.13	.....	.....	Acetone, CP, 700 lb drums c-1				
.15	.13	.12	.12	wks...................lb.	.....	.15	.15	.15
1.75	1.65	1.65	1.65	Acetone Oil, bbls NY.......gal.	1.15	1.25	1.25	1.15
.45	.42	.42	.42	Acetyl Chloride, 100 lb cby...lb.	.65	.45	.65	.65
				Acetylene Tetrachloride (see tetrachlorethane).............				
				Acids				
3.88	3.38	3.38	3.38	Acid Acetic, 28% 400 lb bbls c-1 wks.............100 lb.	.....	3.88	3.88	3.88
13.68	11.92	11.92	11.92	Glacial, bbl c-1 wk.....100 lb.	.....	13.68	13.68	13.68
1.00	.98	.98	.98	Anthranilic, refd, bbls........lb.	.98	1.00	1.00	.98
.80	.80	.80	.80	Technical, bbls............lb.	.....	.80	.80	.80
2.25	1.60	1.60	1.25	Battery, cbys...........100 lb.	1.60	2.25	2.25	1.60
.60	.57	.57	.57	Benzoic, tech, 100 lb bbls....lb.	.57	.60	.60	.57
.11	.08½	.08½	.08½	Boric, crys. powd, 250 lb. bbls...................lb.	.05¾	.06½	.06½	.05¾
1.25	1.25	1.25	1.25	Broenner's, bbls.............lb.	.....	1.25	1.25	1.25
.90	.85	.85	.80	Butyric, 100% basis cbys.....lb	.85	.90	.90	.85
4.85	4.85	4.90	4.85	Camphoric.................lb.	.....	4.85	4.85	4.85
.28	.13	.25	.25	Carbolic, 10%, 50 gal bbls....lb.	.13	.14	.14	.13
.16	.15	.15	.15	Chlorosulfonic, 1500 lb drums wks...................lb.	.04½	.05½	.05½	.04½
.30	.25	.37	.25	Chromic, 99%, drs extra.....lb.	.20	.23	.23	.20
1.06	1.00	1.00	1.00	Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.06	1.00
.44½	.59	.44½	.43	Citric, USP, crystals, 230 lb. bbls...................lb.	.46	.59		.46
.97	.95	.95	.95	Cleve's, 250 lb bbls..........lb.	.52	.54	.59	.52
.70	.68	.60	.57	Cresylic, 95%, dark drs NY..gal.	.60	.70	.54	.60
.72	.72	.70	.60	97-99%, pale drs NY.....gal.	.72	.77	.70	.72
				Formic, tech 85%, 140 lb.			.77	
.12	.11	.11	.10	cby....................lb.	.11	.12		.11
.55	.50	.50	.50	Gallic, tech, bbls............lb.	.50	.55	.12	.50
.74	.74	.74	.69	USP, bbls.................lb.	.....	.74	.55	.74
1.06	1.00	1.00	1.00	Gamma, 225 lb bbls wks.....lb.	.97	.99	.74	.97
.63	.57	.57	.57	H, 225 lb bbls wks..........lb.	.68	.72	.99	.68
.67	.67	.67	.65	Hydriodic, USP, 10% soln cby lb.	.....	.67	.72	.67
				Hydrobromic, 48%, coml, 155			.67	
.48	.45	.45	.45	lb cbys wks...........lb.	.45	.48	.48	.45
				Hydrochloric, CP, see Acid Muriatic.....................			.....	.....
.90	.80	.80	.80	Hydrocyanic, cylinders wks...lb.	.80	.90	.90	.80
.06	.06	.06	.06	Hydrofluoric, 30%, 400 lb bbls wks...................lb.	.....	.06	.06	.06
.11	.11	.11	.11	Hydrofluosilicic, 35%, 400 lb bbls wks..............lb.	.....	.11	.11	.11
.85	.85	.85	.85	Hypophosphorous, 30%, USP, demijohns..............lb.	....	.85	.85	.85
.06	.04¾	.05½	.05½	Lactic, 22%, dark, 500 lb bbls lb.	.04½	.05	.05½	.04½
.13½	.12	.13	.13	44%, light, 500 lb bbls......lb.	.11	.11½	.12½	.11
.54	.52	.52	.52	Laurent's, 250 lb bbls........lb.	.40	.42	.42	.40
.60	.48	.....	.....	Malic, powd., kegs...........lb.	.48	.60	.60	.48
.65	.60	.60	.60	Metanilic, 250 lb bbls........lb.	.60	.65	.65	.60
				Mixed Sulfuric-Nitric..........				
.08	.07¾	.07¾	.07¾	tanks wks..........N unit	.07	.07½	.07½	.07
.01½	.01	.01	.01	tanks wks..........S unit	.008	.01	.01	.008
.21	.18	.21	.18	Monochloroacetic, tech bbl..lb.	.18	21	.21	.18
.65	.65	1.65	1.65	Monosulfonic, bbls..........lb.	1.65	1.70	1 70	1.65
1.40	1.35	1.35	1.35	Muriatic, 18 deg, 120 lb cbys c-1 wks.............100 lb.	.....	1.35	1.40	1.35
				tanks, wks. 100 lb.		1.00	1.00	1.00
1.80	1.70	1.70	1.70	20 degrees, cbys wks...100 lb.	.....	1.45	.....	1.45
.95	85	.95	.95	N & W, 250 lb bbls............	.85	.95	.95	.85
.59	.55	.55	.55	Naphthionic, tech, 250 lb.......	.....	Nom.	.59	.55
5.00	5.00	5.00	5.00	Nitric, 36 deg, 135 lb cbys c-wks................100 lb.	.....	5.00	5.00	5.00
6 00	6.00	6.00	6.00	40 deg, 135 lb cbys, c-1 wks................100 lb.	.....	6.00	6.00	6.00
.11½	.10¾	.11½	.11	Oxalic, 300 lb bbls wks NY...lb.	.11	.11½	.11½	.11
.08½	.08	.08	.07	Phosphoric 50%, 150 lb cby..lb.	.08	.08½	.08½	.08
.16	.16	.19	16	Syrupy, USP, 70 lb drs....lb.	....	.16	.16	.16
.50	.50	.50	.50	Picramic, 300 lb bbls........lb.	.65	.70	.70	.65
.50	.40	.45	.30	Picric, kegs.................lb.	.40	.50	.50	.40
.86	.86	.86	.86	Pyrogalic, technical, 200 lb bbls...................lb.	.....	.86	.86	.86
.32	.27	.27	.27	Salicylic, tech, 125 lb bbl.....lb.	.37	.42	.42	.37
.16	.15	.15	.15	Sulfanilic, 250 lb bbls........lb.	.15	.16	.16	.15
1.95	1.60	1.60	1.60	Sulfuric, 66 deg, 180 lb cbys 1c-1 wks...........100 lb.	1.60	1.95	1.95	1.60
				tanks, wks. ton		15.50	15.50	15.50
1.37½	1.20	1.20	1.20	1500 lb dr wks......100 lb.	1.50	1.65	1.65	1.50
1.12½	1.12½	1.10	1.10	60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.42½	1.27½
1.52½	1.52½	1 50	1.50	Oleum, 20%, 1500 lb. drs 1c-1 wks ....100 lb.	.....	1.52½	1.52½	1.52½

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

tons, whilst the average of previous years has been about 10,000 tons. It is also stated that the Appula factory, which has the monopoly for the manufacture of tartaric acid in Italy, has bought up all available supplies of crude tartar and wine lees up to the end of June and that it is impossible for outside buyers to obtain any but insignificant amounts.

Alcohol — Although the past month, as a whole, was marked by rather consistent inactivity and only routine demand. The announcement of new prices, however, seemed to reawaken activity and a period of heavy selling followed particularly on anti-freeze for the Fall. Production of ethyl alcohol by members of the Industrial Alcohol Institute, Inc., during March totaled 7,154,439 wine gallons, which compares with 6,854,773 gallons during February, an increase of 229,666 gallons or 4 per cent. Production of ethyl alcohol during March of last year amounted to 5,336,274 gallons, which was also a 4 per cent. gain over the preceding month. As compared with last year, however, the March output shows an increase of 34 per cent. The combined inventories of all members on March 31, last, including ethly, C. D., and S. D. alcohol, totaled 12,441,537 gallons, according to the institute, of which 5,583,362 gallons were ethyl, 5,716,625 gallons C. D., and 1,141,550 gallons S. D. alcohol. The February inventories totaled 10,735,785 gallons, of which 5,437,504 were ethyl, 4,588,199 were C. D. and 710,082 gallons were S. D. alcohol. The increase in the inventories of S. D. alcohol over those of February is noteworthy, amounting to 60 per cent. Increases in ethyl and C. D. inventories for March over those of February are both 6 per cent. each. The combined inventories of all members on March 31, 1928, were 13,398,083 gallons, of which 6,791,349 were ethyl, 5,825,216 were C. D. and 781,518 gallons S. D. alcohol. Compared with March, last year, total stocks at the close of last month show a decrease of 956,546 gallons, or 9 per cent.

Ammonia — The market for both aqua and anhydrous is strong and marked by good demand, especially for the latter. Shipments of anhydrous have been showing a steady increase and are expected to increase materially during the next month as the demand from refrigerating fields increases with the advancing season. Exports of ammonia during 1928 totaled 1,907,867 pounds, valued at $314,990, according to the Department of Commerce. The value of these exports to the main world areas was as follows: Europe, $31,781; North and Central

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
42.00	42.00	42.00	42.00	40%, 1c-1 wks net .... ton	.....	42.90	42.00	42.00
.40	.30	.30	.30	Tannic, tech, 300 lb bbls... lb.	.30	.40	.40	.30
.38	.34½	.37	.29½	Tartaric, USP, crys, powd, 300 lb. bbls.......... lb.	.38	.38½	.38½	.38
.85	.85	.85	.85	Tobias, 250 lb bbls .... lb.	.....	.85	.85	.85
2.75	2.75	2.75	2.00	Trichloroacetic bottles...... lb.	.....	2.75	2.75	2.75
2.00	2.00	2.00	2.00	Kegs.................. lb.	.....	2.00	2.00	2.00
1.25	1.00	1.00	1.00	Tungstic, bbls............ lb.	1.00	1.25	1.25	1.00
.55	.43	.45	.45	Albumen, blood, 225 lb bbls.. lb.	.43	.47	.47	.43
.84	.78	.95	.80	Egg, edible.............. lb.	.78	.83	.83	.70
.80	.70	.92	.77	Technical, 200 lb cases .. lb.	.70	.75	.80	.70
.65	.60	.60	.60	Vegetable, edible.......... lb.	.60	65	.65	.60
.55	.50	.50	.50	Technical............. lb.	.50	.55	.55	.50
				Alcohol				
.20	.18¾	.20	.19	Alcohol Butyl, Normal, 50 gal drs c-1 wks............ lb.	.....	.1775	.17¾	.17¾
.19½	.18¾	.20½	.19½	Drums, 1-c-1 wks........ lb.	.....	.1825	.18¼	.18¼
.19	.17¾	.19½	.18½	Tank cars wks......... lb.	.....	.1725	.17¼	.17¼
2.25	1.75	.....	.....	Amyl (from pentane) drs c-1 wks........... gal.	.....	1.67	1.67	1.67
1.80	1.70	1.70	1.70	Diacetone, 50 gal drs del .. gal.	1.70	1.80	1.80	1.70
3.70	2.65	3.70	3.70	Ethyl, USP, 190 pf, 50 gal bbls............... gal.	.....	2.69½	2.69½	2.69½
.55	.50	.50	.50	Anhydrous, drums........ gal.	.....	.71	.71	.71
.52	.48½	.52	.37½	Completely denatured, No. 1, 190 pf, 50 gal drs drums extra............... gal.	.....	.50	.50	.49
.50	.43	.50	.29	No. 5, 188 pf, 50 gal drs. drums extra......... gal.	.....	.49	.49	.48
.46	.41	.46	.25	Tank, cars............ gal.	.....	.47	.47	.46
1.25	1.00	1.00	1.00	Isopropyl, ref, gal drs..... gal.	1.00	1.25	1.25	1.00
1.00	1.00	1.00	1.00	Propyl Normal, 50 gal dr.. gal.	.....	1.00	1.00	1.00
.82	.80	.80	.80	Aldehyde Ammonia, 100 gal dr lb.	.80	.82	.82	.80
.65	.65	.65	.65	Alpha-Naphthol, crude, 300 lb bbls.................. lb.	.....	.65	.65	.65
.37	.35	.35	.35	Alpha-Naphthylamine, 350 lb bbls.................. lb.	.32	.34	.34	.32
3.30	3.25	3.25	3.15	Alum Ammonia, lump, 400 lb bbls, 1c-1 wks....... 100 lb.	3.25	3.30	3.30	3.25
5.50	5.25	5.25	5.25	Chrome, 500 lb casks, wks .... 100 lb.	5.25	5.50	5.50	5.25
3.20	3.10	3.50	3.10	Potash, lump, 400 lb casks wks............... 100 lb.	3.00	3.10	3.20	3.00
5.50	5.25	5.25	5.25	Chrome, 500 lb casks wks .... 100 lb.	5.25	5.50	5.50	5.25
3.75	3.75	3.75	3.75	Soda, ground, 400 lb bbls wks............... 100 lb.	.....	3.75	3.75	3.75
26.00	24.30	27.00	26.00	Aluminum Metal, c-1 NY . 100 lb.	.....	24.30	24.30	24.30
.40	.35	.35	.35	Chloride Anhydrous, 275 lb drums.............. lb.	.35	.40	.40	.35
.18	.17	.17	.17	Hydrate, 96%, light, 90 lb bbls.................. lb.	.17	.18	.18	.17
.24	.18	.23	.23	Stearate, 100 lb bbls....... lb.	.25	.26	.26	.25
1.75	1.75	1.75	1.75	Sulfate, Iron, free, bags c-1 wks............. 100 lb.	1.95	2.05	2.05	1.95
1.40	1.40	1.40	1.35	Coml, bags c-1 wks .. 100 lb.	.....	1.40	1.40	1.40
1.15	1.15	1.15	1.15	Aminoazobenzene, 110 lb kegs lb.	.....	1.15	1.15	1.15
				Ammonium				
.14	.13½	.13½	.10	Ammonia, anhyd, 100 lb cyl.. lb.	.14	.14	.14	.14
.03	.03	.03	.02½	Water, 26°, 800 lb dr del... lb.	.....	.03½	.03½	.03½
				Bicarbonate, bbls., f.o.b. plant 100................. lb.	.....	5.15	6.50	5.15
.22	.21	.21	.21	Bifluoride, 300 lb bbls...... lb.	.21	.22	.22	.21
.09	.08¾	.08¾	.08¾	Carbonate, tech, 500 lb cs.. lb.	.09	.12	.12	.09
5.15	4.45	5.05	4.85	Chloride, white, 100 lb. bbls wks............. 100 lb.	4.45	5.15	5.15	4.45
5.75	5.25	.07	.05½	Gray, 250 lb bbls wks.... lb.	5.25	5.75	5.75	5.25
.11½	.11	.11	.11	Lump, 500 lb cks spot... lb.	.11	.11½	.11½	.11
.16	.15	.15	.15	Lactate, 500 lb bbls....... lb.	.15	.16	.16	.15
.10	.06	.06	.06	Nitrate, tech, casks........ lb.	.06	.10	.10	.06
.38	.27½	.27½	.27½	Persulfate, 112 lb kegs..... lb.	.31	.34	.34	.31
.18	.18	.18	.18	Phosphate, tech, powd, 325 lb bbls................. lb.	.12½	.13	.13	.12½
2.90	2.20	2.30	2.55	Sulfate, bulk c-1....... 100 lb.	.....	2.30	2.40	2.30
3.00	2.50	2.55	2.35	Southern points..... 100 lb.	.....	2.35	2.45	2.35
60.85	60.85	59.70	56.85	Nitrate, 26% nitrogen 31.6% ammonia imported bags............. ton	.....	60.85	60.85	60.85
.60	.55	.55	.55	Sulfocyanide, kegs........ lb.	.36	.48	.48	.36
2.25	1.72	2.25	1.90	Amyl Acetate, (from pentane) drs.................. gal.	1.60	1.70	1.70	1.60
.....	.....	.....	.....	Tech., drs............... gal.	1.60	1.70	1.70	1 60
				Alcohol, see Fusel Oil........				
				Furoate, 1 lb tins......... lb.		5.00		
.16½	.15¾	.15¾	.15	Aniline Oil, 960 lb drs........ lb.	.15¾	.16½	.16½	.15¾
.48	.41	.41	.41	Annatto, fine.............. lb.	.34	.37	.37	.34
1.00	.90	.90	.90	Anthraquinone, sublimed, 125 lb bbls.................. lb.	.80	.90	.90	.80
.12	.09½	.11½	.14	Antimony, metal slabs, ton lots .... lb.	.....	.09⅞	.10	.09½
.12	.10	.15½	.14	Needle, powd, 100 lb cs.... lb.	.....	.10	.10	.10
.18	.17	.17	.17	Chloride, soln (butter of) cbys................... lb.	.17	.18	.18	.17
.12	.09¾	.16½	.16½	Oxide, 500 lb bbls.......... lb.	.....	.09½	.10	.09¾
.....	.....	.28	.25½	Salt, 66%, tins............ lb.	.25½	.26	.26	.25½
.20	.16	.20	.16	Sulfuret, golden, bbls...... lb.	.16	.20	.20	.16
.42	.38	.42	.37½	Vermilion, bbls............ lb.	.38	.42	.42	.38
.19	.17	.18	.18	Archil, conc, 600 lb bbls...... lb.	.17	.19	.19	.17
.14	.12	.12	.12	Double, 600 lb bbls........ lb.	.12	.14	.14	.12
.16	.15	.16	.14	Triple, 600 lb bbls......... lb.	.15	.16	.16	.15
.08	.08	.15	.12½	Argols, 80%, casks.......... lb.	.....	.08	.08	.08
.16	.15	.08	.03	Coude, 30%, casks........ lb.	.15	.16	.16	.15
.11	.10½	.10½	.10½	Arsenic, Red, 224 lb kegs, cs.. lb.	.09	.11	.11	.09
.04	.03¾	.04	.03½	White, 112 lb kegs......... lb.	.04	.04½	.04½	.04
14.75	14.75	14.75	14.75	Asbestine, c-1 wks.......... ton	.....	15.00	15.00	14.75

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

America and the West Indies, $118,053; South America, $91,432; Far East, $40,564; Africa, $33,179; total $314,990. The trade with Europe was about one-tenth of the total. Of this, Great Britain took over 92 per cent. Thirty-seven per cent. went to the North American group, in which the three largest purchasers, Canada, Cuba, and Mexico, accounted for 78 per cent, the respective values of which were $13,514, $35,708, and $42,728. Other principal buyers of ammonia in this section included Guatemala ($1,309), Honduras ($1,860), Panama ($7,162), Trinidad and Tobago ($3,405), Haiti ($2,297), Jamaica ($2,572), Dominican Republic ($1,748), and Salvador and Netherland West Indies ($1,200) each. The South American trade was nearly one-third of the total. Argentina ($38,780), Chile ($16,356), and Colombia used nearly $66,000 or over two-thirds of the group total. Substantial amounts were also bought by Brazil ($8,680), Uruguay ($7,521), Venezuela ($4,633), and Peru ($3,959). About 93 per cent. ($37,625) of the Far East trade went to British India ($12,496), China ($10,420), Philippines ($8,449), and Siam ($6,260). Over 96 per cent. of the African trade went to the Union of South Africa.

Ammonium Bicarbonate — Producers have announced a new price schedule as follows: $5.15 per 100 lbs., f.o.b. Syracuse on carlot, less carlot, contract or spot business. This is a radical change as heretofore prices have been based upon ports of entry. New prices amount to a substantial reduction of from 60c @ 90c per 100 lbs. depending upon quantity. This is in line with a policy to satisfy all domestic requirements. Although 650 tons were imported during 1928, it seems quite likely that this will be cut in half during the present year.

Ammonium Chloride — Although demand has been just a bit off during the past month, prices are being firmly maintained. The presence of electrified radio sets is beginning to make itself felt in this market.

Ammonium Sulfate — There has been but little new business during the past month although supplies have been moving somewhat better on contract. There is no question that this market thus far is considerably behind the position it had reached at this time last year. So far this season the market has failed to attain a very healthy position. Sales of fertilizers through the cotton states in March are estimated by Secretary Hester of the New Orleans Cotton Exchange at 1,929,397

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
				Barium			
57.00	47.00	47.50	47.50	Barium, Carbonate, 200 lb bags wks....................ton	58.00	60.00	60.00	57.00
.12½	.12	.12	.12	Chlorate, 112 lb kegs NY..lb.	.14	.15	.15	.14
65.00	54.00	65.00	57.50	Chloride, 800 lb bbl wks...ton	65.00	68.00	68.00	63.00
.13½	.13	.13	.13	Dioxide, 88%, 690 lb drs...lb.	.12	.13	.13	.12
.04¾	.04¾	.04½	.04½	Hydrate, 500 lb bbls.......lb.	.04¾	.05½	.05½	.04¾
.08	.07½	.07½	.07½	Nitrate, 700 lb casks.......lb.	.08½	.08½	.08½	.08½
24.00	23.00	23.00	23.00	Barytes, Floated, 350 lb bbls wks....................ton	23.00	24.00	24.00	23.00
8.00	5.00	.....	.....	Bauxite, bulk, mines........ton	5.00	8.00	8.00	5.00
.38	.36	.40	.37	Beeswax, Yellow, crude bags..lb.	.....	.36	.37	.36
.43	.41	.46	.38	Refined, cases...........lb.	.....	.41	.42	.41
.58	.56	.58	.56	White, cases..............lb.	.51	.53	.53	.51
.70	.65	.65	.65	Benzaldehyde, technical, 945 lb drums wks.............lb.	.60	.65	.65	.60
				Benzene			
.23	.21	.23	.21	Benzene, 90%, Industrial, 8000 gal tanks wks..........gal.	.....	.23	.23	.23
.23	.21	.23	.21	Ind. Pure, tanks works....gal.	.....	.23	.23	.23
.74	.70	.70	.70	Benzidine Base, dry, 250 lb bbls....................lb.	.70	.74	.74	.70
1.00	1.00	1.00	1.00	Benzoyl, Chloride, 500 lb drs.lb.	.....	1.00	1.00	1.00
.25	.25	.....	.....	Benzyl, Chloride, tech drs....lb.	.....	.25	.25	.25
.26	.24	.24	.24	Beta-Naphthol, 250 lb bbl wk.lb.	.24	.26	.26	.24
1.35	1.35	1.35	1.35	Naphthylamine, sublimed, 200 lb bbls................lb.	.....	1.35	1.35	1.35
.65	.63	.63	.63	Tech, 200 lb bbls..........lb.	.65	.68	.68	.65
90.00	80.00	80.00	80.00	Blanc Fixe, 400 lb bbls wks..ton	80.00	90.00	90.00	80.00
				Bleaching Powder			
2.25	2.25	2.25	2.00	Bleaching Powder, 300 lb drs c-1 wks contract.......100 lb.	.....	2.25	2.25	2.25
2.00	2.00	2.25	2.00	700 lb drs c-1 wks contract ....100 lb.	.....	4.00	4.00	4.00
5.25	4.65	3.75	4.75	Blood, Dried, fob, NY......Unit	.....	4.50	4.60	4.50
5.35	4.75	.....	.....	Chicago................Unit	.....	4.75	4.85	4.50
5.05	4.50	.....	.....	S. American shipt.......Unit	.....	4.60	4.70	4.60
.35	.31	.30	.28	Blues, Bronze Chinese Milori Prussian Soluble........lb.	.....	.35	.35	.32
30.00	29.00	38.00	29.00	Bone, raw, Chicago.........ton	.....	42.00	42.00	42.00
.07	.06	.06	.06	Bone, Ash, 100 lb kegs.......lb.	.06	.07	.07	.06
.08½	.08½	.08½	.08½	Black, 200 lb bbls.........lb.	.....	.08½	.08½	.08½
37.00	31.00	30.00	28.00	Meal, 3% & 50%, Imp....ton	.....	31.00	35.00	30.00
.05	..2½	.04½	.04½	Borax, bags.................lb.	.02½	.03½	.03½	.02½
.12	.10½	.11	.11	Bordeaux, Mixture, 16% pwd..lb.	.10½	.12	.12	.10½
.10	.08	.08	.08	Paste, bbls...............lb.	.10	.10½	.10½	.10
28.00	26.00	28.00	26.00	Brazilwood, sticks, shpmt....lb.	26.00	28.00	28.00	26.00
1.20	.60	.60	.60	Bronze, Aluminum, powd blk.lb.	.60	1.20	1.20	.60
1.25	.55	.55	.55	Gold bulk...............lb.	.55	1.25	1.25	.55
1.60	1.40	1.60	1.42	Butyl, Acetate, normal drs 1c-1 wks...................gal.	1.35	1.40	1.45	1.35
1.55	1.35	1.55	1.42	Tank, drs wks...........gal.	1.33	1.35	1.35	1.33
1.05	1.00	1.00	1.00	Secondary, 50 gal drs.....gal.	1.00	1.05	1.05	1.00
.70	.70	.70	.70	Aldehyde, 50 gal drs wks...lb.	.....	.70	.70	.70
				Carbitol (see Diethylene Glycol Mono Butyl Ether)........	.....	.....	.....	.....
				Cellosolve (see Ethylene glycol mono butyl ether).........				
				Furoate, tech., 50 gal. dr., lb.	.....	.50	.50	.50
.36	.34	.34	.34	Propionate, drs...........lb.	.34	.36	.36	.34
.60	.60	.60	.60	Stearate, 50 gal drs........lb.	.....	.60	.60	.60
.60	.57	.57	.57	Tartrate, drs..............lb.	.57	.60	.60	.57
2.00	1.35	1.50	1.35	Cadmium, Sulfide, boxes.....lb.	.95	1.75	1.75	.75
				Calcium			
4.50	3.50	3.50	3.50	Calcium, Acetate, 150 lb bags c-1................100 lb.	.....	4.50	4.50	4.50
.09	.06	.07½	.07½	Arsenate, 100 lb bbls c-1 wks...................lb.	.07	.09	.09	.07
.06	.05	.05	.05	Carbide, drs..............lb.	.05	.06	.06	.05
1.00	1.00	1.00	1.00	Carbonate, tech, 100 lb bags c-1....................lb.	1.00	1.00	1.00	1.00
27.00	25.00	27.00	27.00	Chloride, Flake, 375 lb drs c-1 wks...............ton	.....	25.00	25.00	25.00
23.00	20.00	21.00	21.00	Solid, 650 lb drs c-1 fob wks ....ton	20.00	20.00	20.00	20.00
52.00	52.00	52.00	52.00	Nitrate, 220 lb bbls c-1 NY.ton	.....	52.00	52.00	52.00
.....	.....	.....	.....	Peroxide, 100 lb. drs.......lb.	.....	1.25	1.25	1.25
.08	.07	.09	.09	Phosphate, tech, 450 lb bbls lb.	.08	.08¾	.08	.07
				Stearate, 100 lb bbls.......lb.	.25	.26	.26	.25
				Calurea, bags...............ton	.....	88.75	88.75	88.75
				S. points..................	.....	88.30	88.30	88.30
.18	.18	.....	.....	Camwood, Bark, ground bbls..lb.	.....	.18	.18	.18
.28	.22	.33	.33	Candelilla Wax, bags........lb.	.23	.24	.24	.22
				Carbitol, (See Diethylene Gycol Mono Methyl Ether)......	.....	.....	.....	.....
.15	.08	.08	.08	Carbon, Decolorizing, 40 lb bags c-1....................lb.	.08	.15	.15	.08
.12	.12	.12	.12	Black, 100-300 lb cases 1c-1 NY...................lb.	.....	.12	.12	.12
.06	.05½	.05½	.05½	Bisulfide, 500 lb drs 1c-1 NY...................lb.	.05½	.06	.06	.05½
.06	.06	.06	.06	Dioxide, Liq. 20-25 lb cyl...lb.	.....	.06	.06	.06
.07½	07	.07	.07	Tetrachloride, 1400 lb drs delivered..............lb.	.06½	.07½	.07½	.06½
.58	.45	.50	.50	Carnauba Wax, Flor, bags....lb.	.40	.41	.43	.40
.60	.40	.90	.54	No. 1 Yellow, bags........lb.	.36	.37	.40	.36
.38	.34	.37	.24	No. 2 N Country, bags.....lb.	.....	.30	.32	.29
.56	.38	.68	.48	No. 2 Regular, bags.......lb.	.34	.35	.36	.33
.32	.25	.....	.....	No. 3 N. C...............lb.	.....	.25	.25	.25
.32	25½	.....	.....	No. 3 Chalky.............lb.	.....	.25½	.26	.25
.18½	.14½	.18½	.15½	Casein, Standard, ground.....lb.	.15½	.16	.16	.15½

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

tons, against 2,051,173 in corresponding months a year ago. The estimate for North Carolina was 289,125 tons, compared with 570,180; South Carolina, 375,015, against 281,434, and Georgia 235,136, against 429,253. Many fertilizer men predict that while the season this year has been somewhat slow in getting under way, fertilizer sales for 1929 will not fall below those of 1928. Secretary Hester estimates that sales of fertilizer in the cotton states for the eight months ended March totaled 3,158,217 tons, compared with 3,779,091 a year ago and 2,687,070 two years ago.

Antimony — Has fallen off considerably during the past month. A decided drop in prices was registered soon after the opening of the month and since that time the market has been dull and inactive with no opportunity for recovery. Demand has been very slack while even the conditions in the primary market have not been such as to transmit any strength to conditions prevailing here. Metal is quoted at 9⅝c lb., a decline of ⅜c lb. since last reported, while oxide is also off ½c lb. at 9½c lb. Needle alone is unchanged at 10c lb.

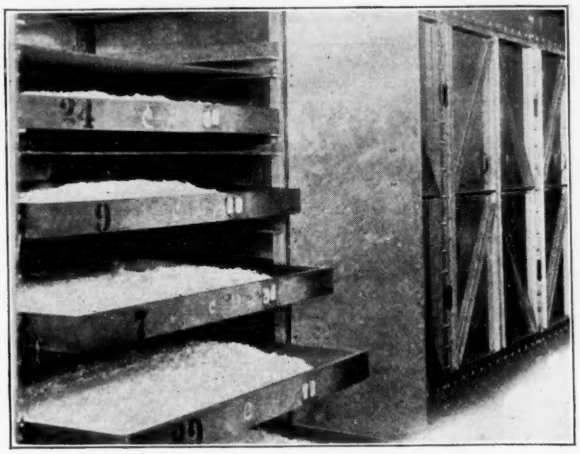
Barium Chloride — Has been in good demand with the market firm at quoted prices according to domestic manufacturers. Demand has come chiefly from the dry color trades which have been active and therefore have purchased this material in good quantity.

Benzol — Both this material and other members of the same group have continued in firm position and marked by heavy demand. Shipments are moving forward as fast as the material is produced.

Blood — Although quotations have remained unchanged in New York and on South American shipment at $4.50 and $4.60 per unit respectively, the Chicago market has advanced to $4.75 @ $5.00 per unit.

Butyl Acetate — Although demand has been good, the market has been in rather unsettled condition due chiefly to competition from imported material which has been coming in in large quantities. Imports probably peaked during March when about 1,200 drums were imported. During April, 725 drums had been imported up to and including April 25. Fortunately demand has been good or the market would have been in even worse condition. On some sides it is thought that domestic production will be increased to protect the home

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
				Cellosolve (see Ethylene glycol mono ethyl ether).........				
				Acetate (see Ethylene glycol mono ethyl ether acetate)..				
.30	.26	.34	.26	Celluloid, Scraps, Ivory cs....lb.	.26	.30	.30	.26
.20	.18	.18	.18	Shell, cases..............lb.	.18	.20	.20	.18
.32	.30	.34	.26	Transparent, cases.. ..... lb.	.30	.32	.32	.30
1.40	1.40	1.40	1.40	Cellulose, Acetate, 50 lb kegs .lb.	1.20	1.25	1.25	1.20
.03¾	.03	.03	.03	Chalk, dropped, 175 lb bbls...lb.	.03	.03¾	.03¾	.03
.04½	.04½	.02½	.02½	Precip, heavy, 560 lb cks...lb.	.02	.03½	.03½	.02
.03½	.02½	.04½	.04½	Light, 250 lb casks........lb.	.02½	.03½	.03½	.02½
.19	.18	.18	.18	Charcoal, Hardwood, lump, bulk wks..................bu.	.18	.19	.19	.18
.06½	.06	.06	.06	Willow, powd, 100 lb bbl wks...................lb.	.06	.06½	.06½	.06
.05	.04	.04	.04	Wood, powd, 100 lb bbls...lb.	.04	.05	.05	.04
.03	.02	.03	.02½	Chestnut, clarified bbls wks,..lb.	.02½	.03	.02	.03½
.02	.01½	.02	.01½	25% tks wks............lb.	.01½	.02	.02	.01½
.04 4/5	.04 4/5	.05½	.05½	Powd, 60%, 100 lb bgs wks.lb.	.....	.04 4/5	.04 4/5	.04 4/5
.06	.05½	.06½	.06½	Powd, decolorized bgs wks..lb.	.05½	.06	.06	.05½
9.00	8.00	8.00	8.00	China Clay, lump, blk mines.ton	8.00	9.00	9.00	8.00
.02	.01¾	.01¾	.01¾	Powdered, bbls...........lb.	.01¾	.02	.02	.01¾
12.00	10.00	10.00	10.00	Pulverized, bbls wks......ton	10.00	12.00	12.00	10.00
25.00	15.00	15.00	15.00	Imported, lump, bulk.....ton	15.00	25.00	25.00	15.00
.03½	.03	.03	.03	Powdered, bbls...........lb.	.03	.03½	.03½	.03
				Chlorine				
.09	.08	.08	.08	Chlorine, cyls 1c-1 wks contract ....lb.	.07½	.08½	.08½	.07½
.....	.....	.....	.....	cyls, cl wks,. contract ...lb.	.....	.04½	.04½	.04½
.03½	.03½	.05½	.04	Liq tank or multi-car lot cyls wks contract............lb.	.....	.03	.03	.03
.07	.07	.07	.07	Chlorobenzene, Mono, 100 lb. drs 1c-1 wks...........lb.	.08½	.09½	.09½	.08½
.22	.20	.20	.20	Chloroform, tech, 1000 lb drs..lb.	.18	.20	.20	.18
1.35	1.00	1.00	1.00	Chloropicrin, comml cyls.....lb.	1.00	1.35	1.35	1.00
.29	.26	.27	.26	Chrome, Green, CP..........lb.	.26	.29	.29	.2C
.11	.06½	.06½	.06½	Commercial...............lb.	.06½	.11	.11	.06½
.17	.15½	.17½	.16½	Yellow...................lb.	.17	.18	.18	.15
.05¾	.04¾	.05	.04½	Chromium, Acetate, 8% Chrome bbls...................lb.	.04¾	.05¾	.05¾	.04¾
.05½	.05½	.05½	.05½	20° soln, 400 lb bbls.....lb.	.....	.05½	.05½	.05½
.28	.27	.27	.27	Fluoride, powd, 400 lb bbl..lb.	.27	.28	.28	.27
.35½	.34½	.34½	.34½	Oxide, green, bbls.........lb.	.34½	.35½	.35½	.34½
9.50	9.00	9.50	9.00	Coal tar, bbls..............bbl	10.00	10.50	10.50	10.00
2.22	2.10	2.10	2.10	Cobalt Oxide, black, bags....lb.	2.10	2.22	2.22	2.10
.87	.84	.92	.77	Cochineal, gray or black bag..lb.	.....	.95	.95	.95
.86	.86	.92	.77	Teneriffe silver, bags.......lb.	.....	.95	.95	.95
				Copper				
17.00	12.90	13.57½	12.90	Copper, metal, electrol...100 lb.	.....	17.78	24.00	17.00
.17½	.16	.16¾	.06½	Carbonate, 400 lb bbls.....lb.	.19	.25	.25	.18
.28	.28	.28	.28	Chloride, 250 lb bbls.......lb.	.25	.28	.28	.25
.50	.48	.48	.48	Cyanide, 100 lb drs........lb.	.55	.60	.60	.48
.17	.16½	.16½	.16½	Oxide, red, 100 lb bbls.....lb.	.....	.18	.18	.16½
.19	.18	.18	.17	Sub-acetate verdigris, 400 lb bbls...................lb.	.18	.19	.19	.18
5.50	5.05	5.00	4.75	Sulfate, bbls c-1 wks...100 lb.	.....	6.00	7.00	5.65
14.00	13.00	17.00	13.00	Copperas, crys and sugar bulk c-1 wks...............ton	13.00	14.00	14.00	13.00
1.35	1.25	1.25	1.25	Sugar, 100 lb bbls.....100 lb.	1.25	1.35	1.35	1.25
.42	.40	.40	.40	Cotton, Soluble, wet, 100 lb bbls...................lb.	.40	.42	.42	.40
.....	.....	42.00	20.00	Cottonseed, S. E. bulk c-1...ton	.....	.....	.....	.....
.....	.....	42.00	20.00	Meal S. E. bulk..........ton	.....	.....	.....	.....
38.00	36.00	35.00	21.50	7% Amm., bags mills...ton	37.50	38.00	38.00	37.50
.27½	.26	.27	.22	Cream Tartar, USP, 300 lb. bbls...................lb.	.27¾	.28	.28	.27¾
.42	.40	.40	.40	Creosote, USP, 42 lb cbys....lb.	.40	.42	.42	.40
.19	.17	.20	.20	Oil, Natural, 50 gal drs....gal.	.17	.19	.19	.17
.23	.21	.25	.25	10-15% tar acid........gal.	.21	.23	.23	.21
.28	.25	.....	.....	25-30% tar acid........gal.	.25	.28	.28	.25
.20	.17½	.17½	.17½	Cresol, USP, drums..........lb.	.14	.17	.17	.14
				Crotonaldehyde, 50 gal dr....lb.	.32	.36		
.17	.16	.17	.16	Cudbear, English............lb.	.16	.17	.17	.16
.18½	.18½	.18½	.15	Cutch, Rangoon, 100 lb bales..lb.	.14	.16	.16	.14
.07	.06	.05	.05½	Borneo, Solid, 100 lb bale..lb.	.08	08½	.08½	.08
1.75	1.67½	1.82½	1.67½	Cyanamide, bulk c-1 wks Amm. ....lb.	.....	1.70	1.70	1.70
5.12	3.77	3.92	3.77	Dextrin, corn, 140 lb bags.100 lb.	4.62	4.82	4.82	4.62
5.07	3.72	3.87	3.72	White, 130 lb bags.....100 lb.	4.57	4.77	4.77	4.57
.09	.08	.08½	.08½	Potato, Yellow, 220 lb bgs..lb.	.08	.09	.09	.08
.09	.08	.08½	.08½	White, 220 lb bags 1c-1....lb.	.08	.09	.09	.08
.08½	.08	.08½	.08	Tapioca, 200 lb bags 1c-1...lb.	.08	.08½	.08½	.08
.....	.....	3.80	3.80	Diaminophenol, 100 lb kegs...lb.	.....	3.80	3.80	3.80
3.80	3.80	2.95	2.85	Diamylphthalate, drs wks...gal.	.....	3.80	3.80	3.80
2.90	2.85	3.25	3.25	Dianisidine, 100 lb kegs......lb.	3.00	3.10	3.10	3.00
.28	.26½	.31½	.29½	Dibutylphthalate, wks.......lb.	.....	.26½	.26½	.26½
.31½	.29½	.55	.55	Dibutyltartrate, 50 gal drs....lb.	.29½	.31½	.31½	.29½
.....	.....	.....	.....	Dichloroethylether, 50 gal drs lb.	.05	.07	.13	.05
.65	.55	.23	.23	Dichloromethane, drs wks....lb.	.55	.65	.65	.55
.25	.23	2.15	2.15	Diethylamine, 400 lb drs.....lb.	.23	.25	.25	.23
2.15	2.15	1.85	1.85	Diethylcarbonate, drs ......gal.	1.85	1.90	1.90	1.85
2.00	1.85	.55	.55	Diethylaniline, 850 lb drs.....lb.	.55	.60	.60	.55
.60	.55.	20	.20	Diethyleneglycol, drs........lb.	.10	.12	.13	.10
.15	.10	.....	.....	Mono ethyl ether, drs....lb.	.13	.15	.15	.13
.35	.25	.....	.....	Mono butyl ether, drs....lb.	.28	.30	.30	.25
				Mono methyl ether, 50 gal.			.15	.13
.....	.....	.....	.....	dr...................lb.	.17	.20	.22	.17
.....	.....	.....	.....	Diethylene oxide, 50 gal dr....lb.	.....	.50	.50	.50
.67	.64	.64	.64	Diethylorthotoluidin, drs.....lb.	.64	.67	.67	.64
.26	.24	.25	.25	Diethyl phthalate, 1000 lb drums.................lb.	.24	.26	.26	.24
.35	.30	.30	.30	Diethylsulfate, technical, 50 gal drums.................lb.	.30	.35	.35	.30
2 62	2.62	2.60	2.60	Dimethylamine, 400 lb drs...lb.	.....	2.62	2.62	2.62
32	.30	.32	.30	Dimethylaniline, 340 lb drs...lb.	.30	.32	.32	30



Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

market but this report has received no confirmation.

Calcium Acetate — Continues firm and strong with production moving into consuming channels just as fast as it becomes available. Production during the past month was about the same as that for March and it is thought that similar conditions will apply during May.

Calcium Chloride — The past month has witnessed the beginning of a fair volume moving into consumption for road use. Both the first quarter and April volume are well ahead of the corresponding periods last year.

Carbon Tetrachloride — Very good demand during the past month is reported by producers of this material. The market has been firm with producers maintaining scheduled prices.

Carnauba Wax — Flora and No. 1, yellow have declined during the past month and are quoted at 40c @ 41c lb. and 36c @ 37c lb., respectively. No. 2 regular and North country are both higher, having experienced rather good demand, and are quoted at 30c lb. and 34c @ 35c lb. respectively. The No. 3 grades have remained unchanged.

Casein — Remains rather quiet but firm, with prices unchanged at 15½c @ 16c lb., which is rather remarkable considering the wave of heavy buying which prevailed about two months ago. Some reaction seemed inevitable, but from the present outlook, the market will continue in good condition.

Chlorine — Continues firm and in good demand, with shipments moving forward in good volume under contract.

Copper Sulfate — The close of the past month was characterized by a consistent inactivity in this market which was the only noticeable reaction following the drop in metal price to 17.775. The metal market has apparently returned to normal, although at last reports it was still rather quiet. The sulfate market has been steady, but with surprisingly little new business for this period of the year. Shipments have been moving forward in heavy volume, probably heavier than ever before, but little new business was being done. Buyers are apparently waiting until the last minute in expectation of lower prices. This will of course lead to very crowded demands later in the season which may even result in higher prices and at least in temporary short supply. The sulfate

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.50	.45	.45	.45	Dimethylsulfate, 100 lb drs...lb.	.45	.50	.50	.45
.16½	.15½	.15½	.15	Dinitrobenzene, 400 lb bbls...lb.	.15½	.16½	.16½	.15½
.19	.18	.18	.18	Dinitrochlorine, 300 lb bbl....lb.	.18	.19	.19	.18
.16	.15	.15	.15	Dintrochlorobenzene, 400 lb bbls....lb.	.13	.15	.15	.1.
.34	.32	.32	.32	Dinitronaphthalene, 350 lb bbls ....lb.	.34	.37	.37	.34
.32	.31	.31	.31	Dinitrophenol, 350 lb bbls....lb.	.31	.32	.32	.31
.19	.18	.18	.15	Dinitrotoluene, 300 lb bbls...lb.	18	.19	.19	.18
.90	.48	1.05	.85	Diorthotolyguanidine, 275 lb bbls wks....lb.	.42	.46	.49	.42
.....	.....	.....	.....	Dioxan (See Diethylene Oxide)	.....	.....	.....	.....
				Diphenyl....lb.	.40	.50	.50	.40
.47	.45	.48	.45	Diphenylamine....lb.	.43	.47	.47	.43
.72	.40	.....	.....	Diphenylguanidine, 100 lb bbl lb.	.30	.35	.40	.30
.30	.26	.26	.26	Dip Oil, 25%, drums....lb.	.26	.30	.30	.26
62.00	58.00	49.00	41.00	Divi Divi pods, bgs shipmt..ton	.....	50.00	57.00	50.00
.05½	.05	.04	.04	Extract....lb.	.05	.05½	.05½	.05
.82	.73	.84	.72	Egg Yolk, 200 lb cases....lb.	.82	.84	.84	.77
1.75	1.7	2.00	1.75	Epsom Salt, tech, 300 lb bbls c-1 NY....100 lb.	1.70	1.75	1.75	1.75
.38	.37	.45	.37	Ether, USP, 1880, 50 lb drs..lb.	.38	.39	.39	.38
1.05	.75	.90	.90	Ethyl Acetate, 85% Ester, 110 gal drs....gal.	.95	.98	1.05	.95
1.25	1.10	1.10	1.03	99% gal drums....gal.	1.15	1.18	1.25	1.15
.....	.....	.....	.....	Acetoacetate, 50 gal drs...gal.	.65	.68	.68	.65
1.11	1.05	1.05	1.05	Benzylaniline, 300 lb drs...lb.	1.05	1.11	1.11	1.05
.70	.70	.50	.50	Bromide, tech, drums....lb.	.50	.55	.55	.50
.....	.....	.....	.....	Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.90	1.85
.22	.22	.22	.22	Chloride, 200 lb. drums....lb.	.....	.22	.22	.22
.....	.....	.....	.....	Chlorocarbonate, 50 gal dr. gal.	.35	.40	.40	.35
.....	.....	.....	.....	Ether, Absolute, 50 gal drs..lb.	.50	.52	.52	.50
				Furoate, 1 lb tins....lb.	.....	5.00	5.00	5.00
3.50	3.50	3.50	3.50	Lactate, drums works....lb.	.25	.29	.35	.25
.30	.30	.30	.30	Methyl Ketone, 50 gal drs..lb.	.....	.30	.30	.30
.55	.45	.45	.45	Oxalate, drums works....lb.	.45	.55	.55	.45
.36	.30	.....	.....	Oxybutyrate, 50 gal drs wks.lb.	.....	.30½	.36	.30
.70	.70	.70	.70	Ethylene Bromide, 60 lb dr...lb.	.....	.70	.70	.79
.85	.75	.75	.75	Chlorhydrin, 40%, 50 gal drs chloro. cont....lb.	.75	.85	.85	.75
.11	.07	.15	.11	Dichloride, 50 gal drums...lb.	.05	.07	.10	.05
.40	.25	.30	.30	Glycol, 50 gal drs wks....lb.	.25	.28	.30	.25
.27	.31	.....	.....	Mono Butyl Ether drs wks.	.23	.27	.31	.23
.20	.24	.....	.....	Mono Ethyl Ether drs wks	.16	.20	.24	.16
.23	.26	.....	.....	Mono Ethyl Ether Acetate dr. wks....	.19	.23	.26	.19
				Mono Methyl Ether, drs.lb.	.19	.23	.23	.19
				Oxide, cyl....lb.	.....	2.00		
.65	.62	.62	.62	Ethylidenaniline....lb.	.62	.65	.65	.62
25.00	20.00	20.00	20.00	Feldspar, bulk....ton	40.00	25.00	25.00	20.00
21.00	15.00	15.00	15.00	Powdered, bulk works....ton	15.00	.21	21.00	15.00
.09	.07½	.07½	.07½	Ferric Chloride, tech, crystal 475 lb bbls....lb.	.07½	.09	.09	.07½
5.50&10	4.90&10	5.60	4.15	Fish Scrap, dried, wks....unit	.....	Nom.	Nom.	Nom.
4.75&50	4.00&50	3.50	4.24	Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	Nom.	Nom.	Nom.
1.15	1.10	1.10	.90	Flavine, lemon, 55 lb cases...lb.	1.10	1.15	1.15	1.10
1.15	1.10	1.10	.85	Orange, 70 lb cases....lb.	1.10	1.15	1.15	1.10
				Flaxseed....lb.	.....	.....		
.....	.....	.....	.....	Ex-dock....ton	.....	25.00	25.00	25.00
25.00	25.00	25.00	25.00	Fluorspar, 98%, bags....	41.00	46.00	46.00	41.00
				Formaldehyde				
.....	.....	.....	.....	Formaldehyde, aniline, 100 lb.	.....	.....	.....	.....
.42	.39	.39	.39	drums....lb.	.39	.42	.42	.39
.09	.08½	.11½	.08¾	USP, 400 lb bbls 1c-1 wks..lb.	.09½	.10	.10	.09½
.04	.02½	.02½	.02½	Fossil Flour....lb.	.02½	.04	.04	.02½
20.00	15.00	15.00	15.00	Fullers Earth, bulk, mines..ton	15.00	20.00	20.00	15.00
30.00	25.00	25.00	25.00	Imp. powd c-1 bags....ton	25.00	30.00	30.00	25.00
.19½	.1 ½	.17½	.17½	Furfural 500 lb drums....lb.	.17½	.19½	.19½	.17½
.....	.....	.....	.....	Furfuramide (tech) 100 lb dr..lb.	.....	.30	.30	.30
.....	.....	.....	.....	Furfuryl Acetate, 1 lb tins....lb.	.....	5.00	5.00	5.00
.....	.....	.....	.....	Alcohol, 100 lb dr....lb.	.....	.50	.50	.50
.....	.....	.....	.....	Furoic Acid (tech) 100 lb dr...lb.	.....	.50	1.00	.50
1.35	1.35	1.69	1.35	Fusel Oil, 10% impurities...gal.	.....	1.35	1.35	1.35
.05	.04	.04	.04	Fustic, chips....lb.	.04	.05	.05	.04
.22	.20	.20	.20	Crystals, 100 lb boxes....lb.	.20	.22	.22	.20
.10	.09	.09	.09	Liquid, 50°, 600 lb bbls....lb.	.09	10	.10	.09
.23	.20	.20	.20	Solid, 50 lb boxes....lb.	.14	.16	.16	14
32.00	30.00	30.00	30.00	Sticks....ton	25.00	26.00	26.00	25.00
.52	.50	.50	.50	G Salt paste, 360 lb bbls....lb.	.50	.52	.52	.50
21	.20	.20	.20	Gall Extract....lb.	.20	.21	.21	.20
.09	.08	.08	.06	Gambier, common 200 lb cs...lb.	.06	.07	.07	.06
.14	.12	.12	.12	25% liquid, 450 lb bbls....lb.	.12	.14	.14	.12
.12	.11	.23	.11	Singapore cubes, 150 lb bg..lb.	.08½	.09	.09	.08½
.50	.45	.45	.30	Gelatin, tech, 100 lb cases....lb.	.45	.50	.50	.45
3.24	3.14	3.14	3.14	Bags, c-1 NY....100 lb.	3.14	3.24	3.24	3.14
1.00	.70	1.05	1.05	Glauber's Salt, tech, 250 lb bags c-1 wks....100 lb.	.70	1.00	1.00	.70
3.34	3.24	3.24	3.24	Glucose (grape sugar) dry 70-80° bags c-1 NY....100 lb.	3.24	3.34	3.34	3.20
3.14	3.14	3.14	3.14	Tanner's Special, 100 lb bags ....100 lb.	.....	3.14	3.14	3.14
.24	.20	.20	.20	Glue, medium white, bbls...lb.	.20	.24	.24	.20
.26	.22	.22	.22	Pure white, bbls....lb.	.22	.26	.26	.22
.19	.15	.29	.22	Glycerin, CP, 550 lb drs....lb.	.15½	.16	.16	.15½
.15	11½	.25	.17	Dynamite, 100 lb drs....lb.	.12	.12½	.12½	.12
.10½	.08½	.....	.....	Saponification, tanks....lb.	.08¾	.08½	.08¾	.08¾
.09½	.07½	.....	.....	Soap Lye, tanks....lb.	.....	.07½	.07½	.07½
35.00	15.00	15.00	15.00	Graphite, crude, 220 lb bgs...ton	15.00	35.00	35.00	15.00
.09	.06	.05	.05	Flake, 500 lb bbls....lb.	.06	.09	.09	.06
				Gums				
.04½	.03¾	.03¾	.03¾	Gum Accroides, Red, coarse and fine 140-150 lb bags....lb.	.03¾	.04½	.04½	.03¾
.06½	.06	.06	.06	Powd, 150 lb bags....lb.	.06	.06½	.06½	.06

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

price has declined $1.00 per hundred pounds since last quoted and is now at $6.00 per 100 pounds. Most of the other salts had not reached price levels comparable with those reached by the metal and thus there was no apparent reaction following the lower copper prices. World copper production totaled 192,792 short tons in March, a record total, against 167,090 tons in February, 178,738 tons in January and 147,842 tons in March, 1928, according to American Bureau of Metal Statistics. The best previous monthly production was in November 1928 at 183,813 tons.

Copperas — Has been in rather large supply due both to heavy production and somewhat curtailed demands from color manufacturers. Although manufacturers maintain schedule prices, considerable material has been available at lower levels.

Divi Divi — In common with the other tanning materials, demand has fallen off considerably during the past month and as a result prices are lower at $50.00 per ton on the pods.

Egg Yolk — Has become practically unobtainable and according to all portents bids fair to remain that way until about July 1 when new supplies become available. Prices have advanced in sympathy with this shortage and quotations are now at 82c @ 84c lb.

Ethyl Acetate — Has been in rather unsettled condition due to competition among domestic producers. Although demand has been in satisfactory volume, prices are stated to be too low in relation to present raw material costs, both alcohol and acetic acid being comparatively high. However, some improvement is looked for within a short time.

Formaldehyde — Continues in heavy demand and with supplies none too abundant. Consequently the market is in very strong position despite the fact that considerable imported material has been available.

Glycerin — Continues to occupy the same position which now has come to be regarded as almost a chronic one. Interesting comments on the world situation are found in "The Chemical Trade Journal" of London which says that, "Optimistic comment on the future of the glycerine market has been decidedly rare these last two years or so, but producers and sellers of the material will at last find a a modicum of comfort in a report that has been compiled by the well-known oils and fats broking firm of Faure, Blattman and Company. This authority points to the fact that a number of soap makers all over Europe who have been accumu-

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.20	.18	.18	.18	Yellow, 150-200 lb bags....lb.	18	.20	.20	.18
				Animi (Zanzibar) bean & pea				
.40	.35	.40	.35	250 lb cases............lb.	.35	.40	.40	.35
.55	.50	.60	.50	Glassy, 250 lb cases.......lb.	.50	.55	.55	.50
				Asphaltum, Barbadoes (Manjak)				
.12	.09	.09	.09	200 lb bags............lb.	.09	.12	.12	.09
.17	.15	.15	.15	Egyptian, 200 lb cases.......lb.	.15	.17	.17	.15
				Gilsonite Selects, 200 lb bags				
65.00	55.00	55.00	55.00	........................ton	58.00	65.00	65.00	58.00
				Damar Batavia standard 136, lb				
.26	.22½	.26½	.26½	cases....................lb.	.23	.24	.26	.23
.11	.10½	.10½	.07	Batavia Dust, 160 lb bags.....lb.	.10½	.11	.11	.10½
.17½	.16	.18½	.17½	E Seeds, 136 lb cases.......lb.	.17	.17½	.17½	.17
				F Splinters, 136 lb cases and				
.14½	.13	.14	.09	bags....................lb.	.13	.13½	.13½	.13
.30½	.29½	.34	.33½	Singapore, No 1, 224 lb cases lb.	.29	.30	.30½	.29
.24	.20	.22½	.21	No. 2, 224 lb cases........lb.	.23	.23½	.24	.23
.15	.13½	.14	.11	No. 3, 180 lb bags.........lb.	.13½	.14	.14	.13½
				Benzoin Sumatra, U. S. P. 120 lb				
.48	.33	.35	.30	cases....................lb.	.38	.40	.40	.38
				Copal Congo, 112 lb bags, clean				
.15	.14	.14	.12	opaque...................lb.	.14	.15	.15	.14
.09	.08¾	.08¾	.08¾	Dark, amber..............lb.	.08¾	.09	.09	.08¾
.14	.12½	.12½	.12½	Light, amber..............lb.	.12½	.14	.14	.12½
.36	.35	.35	.35	Water white..............lb.	.35	.36	.36	.35
.65	.58	.....	.....	Mastic....................lb.	.60	.62	.62	.60
				Manila, 180-190 lb baskets				
.17½	.16	.16	.16	Loba A...................lb.	.17	.17½	.17½	.17
.16½	.15	.15	.15	Loba B...................lb.	.16	.16½	.16½	.16
.14	.13	.14½	.13	Loba C...................lb.	.14	.14½	.14½	.14
.19	.16	.16	.16	Pale bold, 224 lb cs........lb.	.17	.19	.19	.17
.13½	.12	.14	.12	Pale nubs................lb.	.13	.13½	.13½	.13
.11	.07½	.07½	.07½	East Indies chips, 180 lb bags lb.	.10	.11	.11	.10
.21	.17	.....	.....	Pale bold, 180 lb bags....lb.	.20	.21	.21	.20
.16	.14	.17	.17	Pale nubs..............lb.	.15	.16	.16	.15
.....	.....	.....	.....	Pontianak, 224 lb cases....lb.	.....	.....		
.25½	.22	.29	.25	Pale bold gen No 1.....lb.	.22	.23	.23	.22
.15	.13	.19	.13	Pale gen chips spot......lb.	.14½	.15	.15	.14½
.14	.13	.14	.13	Elemi, No. 1, 80-85 lb cs...lb.	.13½	.14	.14	.13½
.13½	.13	.13	.12	No. 2, 80-85 lb cases.....lb.	.13	.13½	.13½	.13
.13	.12	.13	.11	No. 3, 80-85 lb cases.....lb.	.12	.13	.13	.12
				Kauri, 224-226 lb cases No. 1				
.57	.50	.67½	.57	....	.50	.57	.57	.50
.38	.35	.44½	.38	No. 2 fair pale..........lb.	.35	.38	.38	.35
				Brown Chips, 224-226 lb				
.12	.10	.14½	.10	cases................lb.	.10	.12	.12	.10
.....	.....	.42	.38	Bush Chips, 224-226 lb	.....	.....		
.40	.38	.....	.....	cases................lb.	.38	.40	.40	.38
.....	.....	.....	.....	Pale Chips, 224-226 lb cases				
.26	.24½	.31½	.24½	......................lb.	.24½	.26	.26	.24½
				Sandarac, prime quality, 200				
.60	.26	.27	.25	lb bags & 300 lb casks...lb.	.67	.68	.68	.60
.....	.....	.....	.....	Helium, 1 lit. bot. ....lit.	.....	25.00	.20	.17
.20	.17	.12	.12	Hematine crystals, 400 lb bbls lb.	.17	.20	.11	.17
.11	.11	.09	.09	Paste, 500 bbls............lb.	.....	.11	.11	.11
.03¾	.03½	.03½	.03½	Hemlock 25%, 600 lb bbls wks lb.	.03½	.03¾	.03¾	.03½
16.00	16.00	16.00	16.00	Bark....................ton	.....	17.00	17.00	16.00
.60	.60	.60	.45	Hexalene, 50 gal drs wks......lb.	.....	.60	.60	.60
.56	.62	.80	.62	Hexamethylenetetramine, drs.lb.	.56	.58	.58	.56
4.00	4.00	3.35	2.75	Hoof Meal, fob Chicago....unit	.....	3.85	4.00	3.90
.....	.....	3.90	3.0	South Amer. to arrive....unit	.....	3.85	3.90	3.85
				Hydrogen Peroxide, 100 vol, 140				
.26	.24	.30	.22	lb cbys..................lb.	.24	.26	.26	.24
.15	.12	.12	.12	Hypernic, 51°, 600 lb bbls....lb.	.12	.15	.15	.12
1.30	1.28	1.28	1.20	Indigo Madras, bbls..........lb.	1.28	1.30	1.30	1.28
.18	.15	.15	.18	20% paste, drums.........lb.	.15	.18	.18	.15
.08	.07½	.07½	.07½	Solid, powder.............lb.	.07½	.08	.08	.07½
				Iron Chloride, see Ferric or Ferrous				
.10	.09	.09	.09	Iron Nitrate, kegs...........lb.	.09	.10	.10	.09
3.25	2.50	2.50	2.50	Coml, bbls..........100 lb.	2.50	3.25	3.25	2.50
.12	.10	.10	.10	Oxide, English..........lb.	.10	.12	.12	.10
.03½	.02½	.02½	.02½	Red, Spanish...........lb.	.02½	.03½	.03½	.02½
.90	.85	.85	.85	Isopropyl Acetate, 50 gal drs gal.	.85	.90	.90	.85
.20	.17	.29	.17	Japan Wax, 224 lb cases......lb.	.....	.17	.18	.17
70.00	60.00	60.00	60.00	Kieselguhr, 95 lb bgs NY....ton	60.00	70.00	70.00	60.00
.....	.....	14.00	13.00	Lead Acetate, bbls wks...100 lb.	13.00	13.50	13.50	13.00
				White crystals, 500 lb bbls				
13.50	13.00	14.00	13.00	wks...............100 lb.	14.00	14.50	14.50	14.00
.15	.13	.15½	.13½	Arsenate, drs 1c-1 wks.....lb.	.13	.15	.15	.13
				Dithiofuroate, 100 lb dr....lb.	.....	1.00		
6.25	6.25	7.80	6.20	Metal, c-1 NY.........100 lb.	.....	7.75	7.75	6.10
.14	.14	.14	.14	Nitrate, 500 lb bbls wks...lb.	.....	.14	.14	.14
.18	.17½	.17½	.17½	Oleate, bbls..............lb.	.17½	.18	.18	.17½
.08¾	.08¾	.10¾	.08¾	Oxide Litharge, 500 lb bbls.lb.	.....	.08¾	.08¾	.08¾
.09¾	.09¾	.11¾	.09¾	Red, 500 lb bbls wks....lb.	.....	.09¾	.09¾	.09¾
.09	.09	.09¾	.09	White, 500 lb bbls wks...lb.	.....	.09½	.09½	.09
.08½	.08½	.09	.08½	Sulfate, 500 lb bbls wk...lb.	.....	.08¾	.08¾	.08½
				Lenna saltpetre, bags.......ton	.....	62.20	62.20	62.20
				S. points..............ton	.....	62.95	62.95	62.95
4.50	4.50	4.50	4.50	Lime, ground stone bags.....ton	.....	4.50	4.50	4.50
1.05	1.05	1.05	1.05	Live, 325 lb bbls wks...100 lb.	.....	1.05	1.05	1.05
				Lime Salts, see Calcium Salts				
.17	.15	.15	.15	Lime-Sulfur soln bbls........gal.	.15	.17	.17	.15
				Lithopone, 400 lb bbls 1c-1 wks				
.06¼	.06¼	.06¼	.06¼	........................lb.	.....	.05¾	.06¼	.05¾
.08½	.08½	.08½	.08½	Logwood, 51°, 600 lb bbls.....lb.	.08½	.08½	.08½	.08½
.03½	.03	.03	.03	Chips, 150 lb bags..........lb.	.03	.03½	.03½	.03
.12½	.12½	.12	.12	Solid, 50 lb boxes.........lb.		.12½	.12½	.12½
27.00	26.00	26.00	26.00	Sticks....................ton	24.00	26.00	26.00	24.00
.08	.07½	.07½	.07½	Lower grades.............lb.	.07½	.08	.08	.07½
.30	.30	.30	.30	Madder, Dutch..............lb.	.22	.25	.25	.22
50.00	48.00	48.00	48.00	Magnesite, calc, 500 lb bbl...ton	50.00	60.00	60.00	50.00
				Magnesium				
				Magnesium Carb, tech, 70 lb				
.06½	.06	.06½	.06	bags NY.................lb.	06	06½	.06½	.06

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

lating their stocks for a considerable period have become tired of waiting and have disposed of their holdings, and this will assist in clearing the way for better prices. With the exception of a few isolated cases it is stated that manufacturers of glycerine in Europe have no large stocks on hand, and with the falling off in the production it may well be that the consumption in Europe will be able to take care of the total output. Although quoted prices for both crude and refined glycerine are largely nominal, actual business being put through on terms arranged between individual buyers and sellers, it is known that on the whole there has been a slight recovery since the closing months of last year. Soap lyes 80 per cent. crude glycerine, for example, which was realizing about £37 per ton naked f.o.b. European ports at beginning of last year steadily declined to about £24 in November last, but has since recovered and business is being put through at anything from £28 to £30 per ton. This improvement, or at least this definite check to the downward flight of glycerine prices, is due mainly to the resumption of American purchases in Europe owing to the depletion of stocks on the other side of the Atlantic. As the past winter, in America at any rate, has not been a particularly severe one, the demand for glycerine for automobile anti-freeze purposes has not been too pressing, and American buyers have been able to control the position to the extent of withdrawing at any sign of a stiffening in prices asked for glycerine in Europe. Still the tendency has revealed the possibilities of the future and has shown the absence of foundation for too pessimistic a view as to a general and appreciable recovery in glycerine prices. At the same time with ethylene glycol as a bulk commercial product both in America and in this country, and with fermentation glycerine now a practical proposition, any reversion in glycerine prices to the levels obtaining in say 1924 and 1925 must be ruled out as highly improbable."

Gums — Business during the past month has been characterized by a good steady demand with movement into consuming channels in good volume. Stocks seem to be all fairly well maintained with the exception of gum elemi and most factors predict price advances in that item. By far the bulk of the exports from the Dutch East Indies of gum damar during 1928, came into this country, according to the Department of Commerce. Total exports during that year reached 10,960 metric tons, of which the

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
37.00	27.00	37.00	37.00	Chloride flake, 375 lb. drs c-1 wks....................ton	.....	36.00	36.00	36.00
33.00	33.00	33.00	33.00	Important shipment....ton	.....	33.00	33.00	33.00
31.00	31.00	31.00	31.00	Fused, imp, 900 lb bbls NY ton	.....	31.00	31.00	31.00
.10½	.10	.10	.10	Fluosilicate, crys, 400 lb bbls wks....................lb.	.10	.10½	.10½	.10
.42	.42	.42	.42	Oxide, USP, light, 100 lb bbls ....lb.	.....	.42	.42	.42
.50	.50	.50	.50	Heavy, 250 lb bbls......lb.	.....	.50	.50	.50
.....	.....	.....	.....	Peroxide, 100 lb cs.........lb.	.....	1.25	1.25	1.25
.10½	.09¾	.12½	.09¾	Silicofluoride, bbls..........lb.	.09¾	.10½	.10½	.09¾
.25	.23	.23	.23	Stearate, bbls.............lb.	.25	.26	.26	.25
.24	.24	.24	.24	Manganese Borate, 30%, 200 lb bbls....................lb.	.....	.19	.24	.19
.08½	.08	.08	.08	Chloride, 600 lb casks......lb.	.08	.08½	.08½	.08
.....	.....	.05	.04½	Dioxide, tech (peroxide) drs lb.	.04½	.06	.06	.04½
.50	.35	.....	.....	Ore, powdered or granular				
.03½	.03	.03	.03	75-80%, bbls...........lb.	.03	.03½	.03½	.03
.04½	.04	.04	.04	80-85%, bbls...........lb.	.04	.04½	.04½	.04
.05½	.05	.05	.05	85-88%, bbls...........lb.	.05	.05½	.05½	.05
.07½	.07	.07	.07	Sulfate, 550 lb drs NY.....lb.	.08	.08½	.08½	.08
Nom.	.03½	.03½	.03½	Mangrove 55%, 400 lb bbls...lb.	.03½	Nom.	Nom.	.03½
45.00	35.00	39.00	34.00	Bark, African.............ton	.....	31.00	35.00	30.00
12.00	10.00	10.00	10.00	Marble Flour, bulk.........ton	14.00	15.00	15.00	14.00
132.00	121.00	129.00	99.00	Mercury metal.........75lb flask	.....	123.00	124.50	120.00
.74	.72	.72	.72	Meta-nitro-aniline...........lb.	.72	.74	.74	.72
1.80	1.50	1.70	1.70	Meta-nitro-para-toluidine 200 lb. bbls....................lb.	1.50	1.55	1.55	1.50
.94	.90	.90	.90	Meta-phenylene-diamine 300 lb. bbls....................lb.	.84	.90	.90	.84
.74	.72	.72	.72	Meta-toluene-diamine, 300 lb bbls....................lb.	.70	.72	.72	.70

Methanol

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.58	.46	.80	.55	Methanol, (Wood Alcohol), drs 95%....................gal.	.58	.65	.65	.58
.60	.47	.87	.57	97%, drums c-1.........gal.	.60	.65	.65	.60
.63	.44	.....	.....	Pure, drums 1c-1..........gal.	.65	.68	.68	.65
.58	.48	.....	.....	Synthetic, drums c-1......gal.	.63	.66	.66	.63
.75	.45	.80	.75	Denat. gre. tanks..........gal.	.60	.62	.62	.60
.95	.95	.95	.95	Methyl Acetate, drums.....gal.	.. ..	.95	.95	.95
.90	.68	.88	.75	Acetone, 100 gal drums...gal.	.83	.85	.85	.83
.95	.85	1.00	.85	Anthraquinone, kegs.......lb.	.85	.95	.95	.85
.....	.....	.....	.....	Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	.60	.55
60	.55	.55	55	Chloride, 90 lb cyl........gal.	.55	.60	.....	.....
				Furoate, tech., 50 gal. dr., .lb.	.....	50	.50	.50
80.00	65.00	.03½	.03½	Mica, dry grd. bags wks......lb.	65.00	80.00	80.00	65.00
115.00	110.00	.05½	.05½	Wet, ground, bags wks.....lb.	110.00	115.00	115.00	110.00
.....	.....	3.00	3.00	Michler's Ketone, kegs.......lb.	.....	3.00	3.00	3.00
				Monochlorobenzene, drums see, Chorobenzene, mono......lb.				
.75	.70	.70	.70	Monoethylorthotoluidin, drs. lb.	.70	.75	.75	.70
1.05	1.05	1.05	1.05	Monomethylaniline, 900 lb dr ....lb.	.....	1.05	1.05	1.05
4.20	3.95	3.95	3.95	Monomethylparaminosufate 100 lb drums...............lb.	3.95	4.20	4.20	3.95
.07	.06½	.06½	.06½	Montan Wax, crude, bags....lb.	.06½	.07	.07	.06½
.04½	.04½	.04	.04	Myrobalans 25%, liq bbls....b	.04½	.04½	.04½	.04½
.08½	.08	.08	.08	50% Solid, 50 lb boxes.....lb.	.08	.08½	.08½	.08
50.00	42.00	43.50	41.00	J1 bags....................ton	.....	42.00	43.00	40.00
40.00	32.50	37.00	23.50	J 2 bags...................ton	.....	29.00	40.00	29.00
40.00	32.50	37.00	30.00	R 2 bags...................ton	.....	29.00	34.00	29.00
.18	.18	.21	.18	Naphtha, v. m. & p. (deodorized) bbls....................gal.	.....	.18	.18	.18
.06	.05½	.06	.05½	Naphthalene balls, 250 lb bbls wks....................lb.	.....	.05½	.05½	.05½
.04½	.04½	.04½	.04½	Crushed, chipped bgs wks..lb.	.....	.04½	.04½	.04½
.05	.05	.05	.04½	Flakes, 175 lb bbls wks....lb.	.....	.05	.05	.05
.24	.21	.21	.21	Nickel Chloride, bbls kegs....lb.	.21	.24	.24	.21
.38	.35	.35	.35	Oxide, 100 lb kegs NY.....lb.	.37	.40	.40	.37
.09¾	.09	.09	.08½	Salt bbl. 400 bbls lb NY...lb.	.....	.13	.13	.13
.09	.08¾	.08¾	.08	Single, 400 lb bbls NY.....lb.	.....	.13	.13	.13
1.30	1.25	1.25	1.10	Nicotine, free 40%, 8 lb tins, cases....................lb.	1.25	1.30	1.30	1.25
1.20	.98½	1.10	1.10	Sulfate, 10 lb tins.........lb.	.98½	1.20	1.20	.98½
14.00	13.00	13.00	13.00	Nitre Cake, bulk ....ton	12.00	16.00	16.00	12.00
.10½	.10½	10½	.09½	Nitrobenzene, redistilled, 1000 lb drs wks..............lb.	.10½	.10½	.10½	.10½
Nom.	.40	.40	.40	Nitrocellulose, regular drums wks....................lb.	.40	Nom.	Nom.	.40
				Low viscosity (soln only)				
Nom.	.55	.55	.55	Grade 1 drums, wks.......lb.	.55	Nom.	Nom.	.55
Nom.	.50	.50	.50	Grade 2 drums, wks.......lb.	.50	Nom.	Nom.	.50
4.00	3.35	3.60	3.35	Nitrogenous Material, bulk..unit	.....	4.00	4.00	4.00
.25	.25	.25	.25	Nitronaphthalene, 550 lb bbls.lb.	.....	.25	.25	.25
.15	.14	.14	.14	Nitrotoluene, 1000 lb drs wks.lb.	.14	.15	.15	.14
Nom.	.25	.25	.25	Nutgalls Aleppy, bags.......lb.	.16	.16½	.16½	.16
.18	.17	.17	.17	Chinese, bags.............lb.	.12	.13	.13	.12
.24	.22	.22	.22	Powdered, bags...........lb.	.22	.24	.24	.22
.03½	.03½	.03½	.03½	Oak, tanks, wks.............lb.	.....	.03½	.03½	.03½
.04½	.04	.04	.04	23-25% liq., 600 lb bbl wk lb.	.04	.04½	.04½	.04
50.00	45.00	45.00	45.00	Oak Bark, ground...........ton	30.00	35.00	50.00	30.00
23.00	20.00	20.00	20.00	Whole...................ton	20.00	23.00	23.00	20.00
.13½	.13	.14½	.13	Orange-Mineral, 1100 lb casks NY....................lb.	.12½	.13½	.13½	12½
2.25	2.20	2.20	2.20	Orthoaminophenol, 50 lb kgs..lb.	2.20	2.25	2.25	2.20
2.50	2.35	2.50	2.35	Orthoanisidine, 100 lb drs....lb.	2.50	2.60	2.60	2.50
.65	.50	.50	.50	Orthochlorophenol, drums....lb.	.50	.65	.65	.50
.28	.18	.18	.18	Orthocresol, drums..........lb.	.18	.28	.28	.18
.07	.06	.06	.06	Orthodichlorobenzene, 1000 lb drums....................lb.	.07	.10	.10	.07
.35	.32	.32	.32	Orthonitrochlorobenzene, 1200 lb drs wks..............lb.	30	.33	.33	.30

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

United States took 5,291 tons. Exports to the United States in the past six years have advanced from 20 per cent. of the total in 1923 to 48 per cent. last year. Chief countries of origin of the gum were Borneo, 2,080 metric tons; Sumatra, 1,767 metric tons; Java (re-exports), 5,347 metric tons; Celebes and Moluccas, 959 metric tons. Banka, Billiton, and other sections of the Netherlands East Indies supplied the remainder.

During January, this country also received about 60 per cent. of the total exports of kauri gum from New Zealand. Total exports for that month amounted to 431 tons, or 101 more tons than were shipped in December.

Mangrove Bark — Due to a slackening of demand, prices have declined during the past month and quotations are now at $31.00 per ton.

Mercury — The past month has been characterized by prolonged inactivity, with small demand resulting in lowered prices. Quotations are now at $123.00 per flask.

Methanol — Is in good position being just slightly short on supply, but not so bad as about two months ago. New production, approximating 2,000,000 gallons per year is expected in the market within the near future, but it is hard to say just what effect this will have upon market conditions. It is thought that perhaps one tendency will be to encourage wood distillers to convert more of their product into the 95 and 97 per cent. grades.

Methyl Acetate — Has occasioned considerable interest during the past month because for some time it was unobtainable. It is now said to be possible to get supplies but the material is pretty short and it is thought quite likely that prices may advance.

Methyl Acetone — Is in comfortable supply and moving in routine fashion into consuming channels.

Nitrogenous Material — Although spot material remains at $4.00 per unit, material for shipment is being quoted at $3.75 per unit.

Phenol — Movement has been good against contract deliveries, but spot material is still in very short supply and only obtainable at advanced prices. Producers are well sold up and the heavy demand is expected to continue throughout the summer months.

Rosin — Although demand has been fairly active, the first past month has witnessed continued decline in prices so that all grades are from 40c @ $1.05 per unit lower than when last quoted.

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.18	.17	.13	.13	Orthonitrotoluene, 1000 lb drs wk....lb.	.17	.18	.18	.17
.90	.85	.85	.85	Orthonitrophenol, 350 lb dr...lb.	.85	.90	.90	.85
.31	.29	.29	.25	Orthotoluidine, 350 lb bbl 1c-1 lb.	.25	.30	.30	.25
.75	.70	.70	.70	Orthonitroparachlorphenol, tins....lb.	.70	.75	.75	.70
.17	.16	.16	.16	Osage Orange, crystals....lb.	.16	.17	.17	.16
.07	.07	.07	.07	51 deg. liquid....lb.	.07	.07½	.07½	.07
.15	.14½	.14½	.14½	Powdered, 100 lb bags....lb.	.14½	.15	.15	.14½
				Paraffin, refd, 200 lb cs slabs				
.06¾	.06½	.06½	.06½	123-127 deg. M. P....lb.	.06	.06½	.06¾	.06½
.07¾	.07½	.07½	.07½	128-132 deg. M. P....lb.	.06½	.06¾	.07	.06½
.08½	.08	.08	.08	133-137 deg. M. P....lb	.07½	.07¾	.07¾	.07½
.10	.08¾	.08¾	.08¾	138-140 deg. M. P....lb.	.08	.09	.09	.08
.28	.20½	.29	.26	Para Aldehyde, 110-55 gal drs..lb.	.20½	.23	.28	.20½
1.05	1.00	1.00	1.00	Aminoacetanilid, 100 lb bg..lb.	1.00	1.05	1.05	1.00
1.30	1.25	1.25	1.25	Aminohydrochloride, 100 lb kegs....lb	1.25	1.30	1.30	1.25
1.15	1.15	1.15	1.15	Aminophenol, 100 lb kegs..lb.	.....	1.15	1.15	1.15
.65	.50	.50	.50	Chlorophenol, drums....lb.	.50	.65	.65	.50
.....	.....	.12	.12	Coumarone, 330 lb drums..lb.	.....	.....	.....	.....
2.50	2.25	2.25	2.25	Cymene, refd, 110 gal dr..gal.	2.25	2.50	2.50	2.25
.20	.17	.17	.17	Dichlorobenzene, 150 lb bbls wks....lb.	.17	.20	.20	.17
.55	.50	.53	.50	Nitroacetanilid, 300 lb bbls.lb.	.50	.55	.55	.50
.59	.48	.52	.52	Nitroaniline, 300 lb bbls wks....lb.	.48	.59	.49	.48
.32	.32	.32	.32	Nitrochlorobenzene, 1200 lb drs wks....lb.	.23	.26	.26	.23
2.85	2.75	2.75	2.75	Nitro-orthotoluidine, 300 lb bbls....lb.	2.75	2.85	2.85	2.75
.55	.50	.50	.50	Nitrophenol 185 lb bbls....lb.	50	.55	.55	.50
.94	.92	.92	.92	Nitrosodimethylaniline, 120 lb. bbls....lb.	.92	.94	.94	.92
.30	.30	.30	.25	Nitrotoluene, 350 lb bbls....lb.	.....	.30	.30	.30
1.20	1.15	1.20	1.15	Phenylenediamine, 350 lb bbls....lb.	1.15	1.20	1.20	1.15
.41	.40	.40	.40	Tolueneulfonamide, 175 lb bbls....lb.	.70	.75	.75	.70
.22	.20	.20	.18	Toluenesulfonchloride, 410 lb bbls wks....lb.	.20	.22	.22	.20
.42	.40	.45	.38	Toluidine, 350 lb bbls wk...lb.	.40	.42	.42	.40
				Paris Green, Arsenic Basis				
.25	.20	.21	.21	100 lb kegs....lb.	.....	.27	.27	.25
.23	.17	.19	.19	250 lb kegs....lb.	.....	.25	.25	.23
.....	.....	.25	.25	Persian Berry Ext., bbls....lb.	.25	Nom.	.25	.25
.03	.02½	.02½	.02½	Petrolatum, Green, 300 lb bbl.lb.	.02	.02⅛	.02⅛	.02
.13	.20	.18	.16	Phenol, 250-100 lb drums....lb.	.13½	.16	.16	.13½
1.35	1.35	1.35	1.28	Phenyl-Alpha Naphthylamine, 100 lb kegs....lb.	.....	1.35	1.35	1.35
				Phosphate				
				Phosphate Acid (see Superphosphate)				
				Phosphate Rock, f.o.b. mines				
3.15	3.00	3.00	3.00	Florida Pebble, 68% basis..ton	3.00	3.15	3.15	3.00
3.65	3.50	3.50	3.50	70% basis....ton	3.75	4.00	4.00	3.50
4.15	4.00	4.00	3.85	72% basis....ton	4.25	4.50	4.50	4.00
5.00	5.00	5.35	5.00	75-74% basis....ton	5.25	5.50	5.50	5.00
5.75	5.75	5.75	5.60	75% basis....ton	.....	5.75	5.75	5.75
6.25	6.25	6.25	6.00	77-76% basis....ton	.....	6.25	6.25	6.25
5.00	5.00	5.50	5.00	Tennessee, 72% basis....ton	.....	5.00	5.00	5.00
.40	.35	.35	.35	Phosphorous Oxychloride 175 lb cyl....lb.	.35	.40	.40	.35
.65	.60	.65	.60	Red, 110 lb cases....lb.	.55	.60	.60	.55
.32	.32	.32	.32	Yellow, 110 lb cases wks..lb.	.....	.32	.32	.32
.46	.46	.46	.46	Sesquisulfide, 100 lb cs....lb.	.....	.44	.46	.44
.....	.....	.35	.35	Trichloride, cylinders....lb.	.....	.35	.35	.35
.20	.18	.18	.18	Phthalic Anhydride, 100 lb bbls wks....lb.	.18	.20	.20	.18
45.00	37.00	40 00	37.00	Pigments Metallic, Red or brown bags, bbls, Pa. wks....ton	37 00	45.00	45.00	37.00
				Pine Oil, 55 gal drums or bbls				
.64	.63	.63	.63	Destructive dist....lb.	.63	.64	.64	.63
10.60	8.00	8.00	8.00	Prime bbls....bbl.	8.00	10.60	10.60	8.00
.70	.70	.70	.66	Steam dist. bbls....gal.	.65	.70	.70	.65
45.00	40.00	40.00	40.00	Pitch Hardwood,.... wks....ton	40.00	45.00	45.00	40.00
3.30	3.30	3.30	3.30	Plaster Paris, tech, 250 lb bbls....bbl.	3.30	3.50	3.50	3.30
				Potash				
.07⅛	.07⅛	.07⅛	.07⅛	Potash, Caustic, wks....lb.	.....	.07⅛	.07⅛	.07⅛
.07½	.07½	.07½	.07½	Imported casks c-1....lb.	.....	.07½	.07½	.07½
				Potash Salts, Rough Kainit				
9.00	9.00	9.00	9.00	12.4% basis bulk....ton	.....	9.10	9.10	9.00
9.50	9.50	9.50	9.50	14% basis....ton	.....	9.60	9.60	9.50
				Manure Salts....				
12.40	12.40	12.40	12.40	20% basis bulk....ton	.....	12.50	12.50	12.40
18.75	18.75	18.75	18.75	30% basis bulk....ton	.....	18.95	18.95	18.75
36.40	36.40	36.40	36.40	Potassium Muriate, 80% basis bags....ton	.....	36.75	36.75	36.40
27.00	27.00	27.00	27.00	Pot. & Mag. Sulfate, 48% basis bags....ton	.....	27.50	27.50	27.00
47.30	47.30	47.30	47.30	Potassium Sulfate, 90% basis bags....ton	.....	47.75	47.75	47.30
.09½	.09	.09	.09	Potassium Bicarbonate, USP, 320 lb bbls....lb.	.1[illegible]	.14	.14	.13
.09¼	.08½	.08½	.08	Bichromate Crystals, 725 lb casks....lb.	.09	.09¼	.09¼	.09
.12¾	.12	.12	.11	Powd., 725 lb cks wks....lb.	.13	.13¼	.13¼	.13

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

Salt Cake — The prevailing scarcity of domestic material continues and the market is very strong. Imported material has been coming in in considerable quantity, to supplement supplies of domestic, but this has as yet had no weakening effect upon the market.

Shellac — The early part of the month witnessed an unusually unsettled condition in the market. Low prices followed the weakness existing at that time and although the market has steadied somewhat since and trading become somewhat more active, a full recovery has not as yet been made. However, the end of the month found conditions much steadier, with the market firm and characterized by an upward price tendency. Bone dry is at 55c lb., garnet at 43c lb., superfine at 45c @ 46c lb., and T. N. at 41c @ 42c lb.

Soda Ash — Is reported to be in excellent condition with the first quarter well ahead of that of a year ago.

Soda Caustic — Perhaps the best condition exists in this market as has prevailed during any previous time during the past five years. Demand seems less spotty by industries and the general condition is a very healthy one. Returns for the first quarter of the present year show that the volume of business is well ahead of that of the similar period of last year.

Sodium Nitrate — During the past month the market has remained unchanged without any sign of weakness on the part of importers, as the unsold surplus now coming forward seems to be limited and resale material has practically disappeared. In fact, this material at present seems to be setting the pace for other fertilizer materials. Reports from London, state that with the improvement in weather conditions, the demand has become active all over Europe and heavy deliveries are now taking place, those for the second half of March recording an increase of 66,000 tons as compared with last year. In view of the fact that the season is at least a month late, it is anticipated that deliveries from April 1st to June 30th will largely exceed last year's figure of 366,000 tons. The Chilean Delegation, for the purpose of thoroughly investigating the conditions surrounding Nitrate of Soda in the United States, spent most of the month in making an exhaustive inquiry, after which they are to visit Europe for the same purpose, and after their labors are finally completed prices will be fixed for next season. Further merger developments are contained in the following statement issued by the Lautaro Company.

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.17	.16	.16	.16	Binoxiate, 300 lb bbls......lb.	.16	.17	.17	.16
.30	.30	.30	.30	Bisulfate, 100 lb kegs......lb.	.....	.30	.30	.30
.05½	.05⅝	.05⅝	.05⅝	Carbonate, 80-85% calc. 800 lb casks..............lb.	.05⅝	.05½	.05½	.05⅝
.09	.06½	.08½	.08½	Chlorate crystals, powder 112 lb keg wks...........lb.	.08½	.09	.09	.08½
.08½	.07½	.08½	.08½	Imported 112 lb kegs NY.............lb...	.07½	.07¾	.07¾	.07½
.05½	.05⅝	.05⅝	.05⅝	Chloride, crys bbls.........lb.	.05⅝	.05½	.05½	.05⅝
.28	.27	.27	.27	Chromate, kegs...........lb.	.27	.28	.28	.27
.57½	.55	.55	.55	Cyanide, 110 lb. cases.....lb.	.55	.57½	.57½	.55
.12	.11½	.11½	.11½	Metabisulfite, 300 lb. bbl...lb.	.12	.13	.13	.11½
.17	.16	.16	.16	Oxalate, bbls.............lb.	.20	.24	.24	.16
.12	.11	.11	.11	Perchlorate, casks wks.....lb.	.11	.12	.12	.11
.15½	.15	15½	.14½	Permanganate, USP, crys 500 & 100 lb drs wks........lb.	.16	.16½	.16½	.16
.38	.37	.39	.37½	Prussiate, red, 112 lb keg...lb.	.38	.40	.40	.38
.18½	.18	.18	.18	Yellow, 500 lb casks.....lb.	.18½	.21	.21	.18¼
.51	.51	.51	.51	Tartrate Neut, 100 lb keg..lb.	.....	.21	.51	.51
.25	.25	.25	.25	Titanium Oxalate, 200 lb bbls ....lb.	.21	.23	.25	.21
.....	.....	.....	.....	Propyl Furoate, 1 lb tins.....lb.	.....	5.00	5.00	5.00
.05	.04	.04	.04	Pumice Stone, lump bags.....lb.	.04	.05	.05	.04
.06	.04½	.04½	.04½	250 lb bbls.............lb.	.04½	.06	.06	.04½
.03	.02½	.02½	.02½	Powdered, 350 lb bags.....lb.	.02½	.03	.03	.02½
.03½	.03½	3.75	3.75	Putty, commercial, tubs..100 lb.	.....	.03½	.03½	.03½
.05½	.05½	5.50	5.50	Linseed Oil, kegs......100 lb.	.....	.05½	.05½	.05½
1.50	1.50	3.00	1.50	Pyridine, 50 gal drums......gal.	.....	1.75	1.75	1.50
.13¾	.13	.13	.12	Pyrites, Spanish cif Atlantic ports bulk.............unit	.13	.13¾	.13¾	.13
.04	.03	.03	.03	Quebracho, 35% liquid tks....lb.	.03½	.04	.04	.03½
.04½	.03½	.03½	.03½	450 lb bbls c-1..........lb.	.03¾	.04½	.04½	.03¾
.05½	.04	.04	.04	35% Bleaching, 450 lb bbl .lb.	.04½	.05½	.04½	.05½
.05¾	.05	.05	.04⅞	Solid, 63%, 100 lb bales cif..lb.	.05½	.05¾	.05¾	.05½
.05⅞	.05	.05	.05	Clarified, 64%, bales.....lb.	.....	.05⅞	.05⅞	.05⅞
.06	.05½	.06½	.06½	Quercitron, 51 deg liquid 450 lb bbls.................lb.	.05½	.06	.06	.05½
.13	.10	.10	.10	Solid, 100 lb boxes.........lb.	.10	.13	.13	.10
14.00	14.00	14.00	14.00	Bark, Rough...........ton	.....	14.00	14.00	14.00
35.00	34.00	34.00	34.00	Ground................ton	34.00	35.00	35.00	34.00
.46	.45	.45	.45	R Salt, 250 lb bbls wks......lb.	.45	.46	.46	.45
.....	.....	.18	.18	Red Sanders Wood, grd bbls..lb.	.....	.18	.18	.18
1.35	1.25	1.25	1.25	Resorcinol Tech, cans........lb.	1.15	1.25	1.25	1.15
.57	.57	.67	.57	Rosin Oil, 50 gal bbls, first run ....gal.	.....	.62	.62	.57
.62	.62	72	.62	Second run............gal.	.....	.64	.34	.62

Rosin

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
				Rosins 600 lb bbls 280 lb...unit				
9.75	8.20	13.00	8.50	B........................	.....	7.45	8.30	7.45
9.80	8.25	13.00	8.50	D........................	.....	7.70	8.65	7.70
9.95	8.60	13.15	8.50	E........................	.....	8.35	9.10	8.35
10.10	8.65	13.20	8.50	F........................	.....	8.45	9.30	8.45
10.10	8.75	13.25	8.50	G........................	.....	8.45	9.45	8.45
10.10	8.75	13.30	8.50	H........................	.....	8.50	9.50	8.50
10.15	8.80	13.35	8.55	I........................	.....	8.50	9.50	8.50
10.15	8.85	14.80	8.65	K........................	.....	8.55	9.55	8.55
10.30	8.85	15.00	8.80	M........................	.....	8.55	9.85	8.55
11.00	9.15	15.85	9.15	N........................	.. ..	9.10	10.30	9.10
11.65	10.15	16.60	10.50	WG......................	.....	9.45	11.30	9.45
12.65	10.40	18.55	12.00	WW......................	.....	9.95	12.30	9.95
30.00	24.00	24.00	24.00	Rotten Stone, bags mines....ton	24.00	30.00	30.00	24.00
.08	.07	.07	.07	Lump, imported, bbls......lb.	.07	.08	.08	.07
.12	.09	.09	.09	Selected bbls.............lb.	.09	.12	.12	.09
.05	.02	.02	.02	Powdered, bbls...........lb.	.02	.05	.05	.02
05	.04½	.04½	.04½	Sago Flour, 150 lb bags......lb.	.04½	.05	.05	.04½
.....	.....	.90	.90	Sal Soda, bbls wks.......100 lb.	.....	1.00	1.00	1.00
20.00	19.00	19.00	19.00	Salt Cake, 94-96% c-1 wks. .ton	19.00	20.00	20.00	19.00
17.00	15.00	15.00	15.00	Chrome ....ton	12.00	15.00	17.00	12.00
.06½	.06⅛	.06⅛	.06⅛	Saltpetre, double refd granular 450-500 lb bbls.........lb.	.06⅛	.06½	.06½	.06⅛
.01½	.01½	.01½	.01½	Satin, White, 500 lb bbls.....lb	.....	.01½	.01½	.01½
.62½	.49	.66	.47	Shellac Bone dry bbls........lb.	.....	.55	.61	.55
.55	.45	.57	.41	Garnet, bags.. ....lb.	.. ..	.43	.45	.43
.58	.47	.65	40	Superfine, bags............lb.	.....	.45	.47	.45
.55	.42	.37	.57	T. N. bags...............lb.	.....	.41	.44	.41
.57	.53	.50	.50	Schaeffer's Salt, kegs.........lb.	.53	57	.57	.53
11.00	8.00	6.00	6.00	Silica, Crude, bulk mines....ton	8.00	11.00	11.00	8.00
30.00	22.00	15.00	15.00	Refined, floated bags......ton	22.00	30.00	30.00	22.00
.....	.....	32.00	32.00	Air floated bags........ton	.....	32.00	32.00	32.00
40.00	32.00	55.00	55.00	Extra floated bags......ton	32.00	40.00	40.00	32.00
22.00	15.00	15.00	15.00	Soapstone, Powdered, bags f. o. b. mines.................ton	15.00	22.00	22.00	15.00

Soda

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
1.40	1.40	1.32½	1.32½	Soda Ash, 58% dense, bags c-1 wks................100 lb.	.....	1.40	1.40	1.4
2.29	2.40	2.14	2.04	58% light, bags.......100 lb.	.....	1.34½	1.34½	1.34½
1.32½	1.32½	1.32½	1.32½	Contract, bags c-1 wks.100 lb.	.....	1.32	1.32	1.32
4.21	4.16	4.16	4.06	Soda Caustic, 76% grnd & flake drums..............100 lb.	.....	3.35	3.35	3.35
3.91	3.76	3.76	3.66	76% solid drs.........100 lb.	.....	2.95	2.95	2.95
3.00	3.00	3.00	3.00	Contract, c-1 wks......100 lb.	.....	2.90	2.90	2.90
.05	.04½	.04½	.04½	Sodium Acetate, crystals, 450 lb. bbls wks...............lb.	.05½	.06	.06	.05
.....	.....	.19	.18	Arsenate, drums..........lb.	.18	.19	.19	.18
.....	.....	1.00	1.00	Arsenite, drums..........gal.	1.00	1.50	1.50	1.00
2.41	2.41	2.41	2.41	Bicarb, 400 lb bbl NY..100 lb.	.....	2.41	2.41	2.41

Sodium Bichromate
Superphosphate

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

"Negotiations have taken place between representatives of the Lautaro Nitrate Co., Ltd. and the Anglo-Chilean Consolidated Nitrate Corporation looking to the introduction of the Guggenheim process into the operations of the Lautaro Co. The plan under consideration contemplates the exchange of present Lautaro shares for Lautaro preference shares, with a bonus of new ordinary shares, and that compensation to Anglo-Chilean will be entirely in the form of new ordinary shares of the Lautaro Co.; also that a new Guggenheim process plant is to be financed with Lautaro bonds. The Chilean Government has indicated that it regards the plan as being in the interest of the nitrate industry generally. Details of the plan remain to be worked out and formal agreement made, after which the proposition will be submitted to Lautaro shareholders for their approval."

Total production during the period from July 1928 to March 1929 is reported at 24,707,145 metric quintals, comparing with 17,777,913 during the same period of the previous year. Exports were 24,476,386 metric quintals as compared with 23,850,850 in the preceding year. Of the total amount exported during the nine months ended March 31, 1929, 15,313,845 metric quintals were despatched to Europe and Egypt, while 7,593,779 metric quintals were shipped to the United States, and 1,568,762 metric quintals to various other countries. The total number of oficinas in operation during March, 1929, was 69, as compared with 63 in March, 1928.

Sodium Phosphate — Conditions in the market for tri- have been rather unsettled but all factors look for improvement in a short time. Considerable imported material has been available.

Toluol — Has been in excellent demand with a heavy volume of shipments going into consuming channels.

Turpentine — The early part of the month witnessed a decisive decline in prices and despite a recovery and increasing steadiness in the market, prices are considerably lower than when last reported. Spirits is quoted at 53½c @ 59½c gal. while steam distilled is at 50c @ 51c gal.

OILS AND FATS

Chinawood Oil — Conditions in China during the past few months have not been conducive to facilitating ordinary matters of business to any great degree, so that stocks at the Coast during the past month have in general been smaller, thus result-

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.07	.06½	.06½	.06½	Bichromate, 500 lb cks wks. lb.	.07½	.07¾	.07¾	.07½
.04	.04	.08½	.08½	Bisulfite, 500 lb bbl wks.... lb.	.....	.04	.04	.04
1.35	1.30	1.30	1.30	Carb. 350 lb bbls NY .. 100 lb.	1.30	1.35	1.35	1.30
.06¾	.05¾	.06½	.06½	Chlorate, 112 lb kegs wks .. lb.	.06½	.07	.07	.06½
13.00	12.00	12.00	12.00	Chloride, technical........ ton	12.00	13.00	13.00	12.00
.20	.20	.20	.20	Cyanide, 96-98%, 100 & 250 lb drums wks........... lb.	.18	.20	.20	.18
.09	.08¾	.08¾	.08¾	Fluoride, 300 lb bbls wks... lb.	.08¾	.09	.09	.08¾
.24	.22	.22	.22	Hydrosulfite, 200 lb bbls f. o. b. wks.................. lb.	.22	.24	.24	.22
.05	.05	.05	.05	Hypochloride solution, 100 lb cbys.................. lb.	.....	.05	.05	.05
3.05	2.65	2.65	2.65	Hyposulfite, tech, pea cyrs 375 lb bbls wks...... 100 lb.	2.65	3.05	3.05	2.65
2.65	2.40	2.40	2.40	Technical, regular crystals 375 lb bbls wks.... 100 lb.	2.40	2.65	2.65	2.40
.45	.45	.70	.45	Metanilate, 150 lb bbls.... lb.	.....	.45	.45	.45
.....	.....	.02½	.02½	Monohydrate, bbls........ lb.	.....	.02½	.02½	.02½
.57	.55	.55	.55	Naphthionate, 300 lb bbl... lb.	.55	.57	.57	.55
2.45	2.12½	2.67	2.25	Nitrate, 92%, crude, 200 lb bags c-1 NY...... 100 lb.	.....	2.22½	2.22½	2.22½
.08¾	.07½	.08¾	.08	Nitrite, 500 lb bbls spot.... lb.	.07½	.08	.08	.07½
.27	.25	.25	.25	Orthochlorotoluene, sulfonate, 175 lb bbls wks....... lb.	.25	.27	.27	.25
.23	.20	.20	.20	Oxalate Neut, 100 lb kegs .. lb.	.37	.42	.42	.37
3.90	3.90	3.90	3.90	Paratoluene, tri-sodium, tech. 100 lb bbls c-1.... 100 lb.	.....	3.90	3.90	3.90
.09	.08	.08	.08	Sulfonate, 175 lb bbls.... lb.	.08	.09	.09	.08
.22	.21	.21	.21	Perborate, 275 lb bbls..... lb.	.18	.20	.22	.18
3.55	3.25	3.25	3.25	Phosphate, di-sodium, tech. 310 lb bbls....... 100 lb.	3.25	3.55	3.55	3.25
.....	.....	.....	.....	tri-sodium, tech, 325 lb bbls................ 100 lb.	3.90	4.00	4.00	3.90
.72	.69	.69	.69	Picramate, 100 lb kegs..... lb.	.69	.72	.72	.69
.12½	.12	.12	.11	Prussiate, Yellow, 350 lb bbl wks................. lb.	.12	.12½	.12½	.12
.14	.13½	.13½	.13½	Pyrophosphate, 100 lb keg.. lb.	.15	.20	.20	.15
1.45	1.20	1.20	1.20	Silicate, 60 deg 55 gal drs, wks .... 100 lb.	.....	1.65	1.55	1.65
1.10	.85	.85	.85	40 deg 55 gal drs, wks .... 100 lb.	.70	.80	.80	.70
.05	.05	.04½	.04½	Silicofluoride, 450 lb bbls NY .... lb.	.05	.05½	.05½	.05
.49	.48½	.48½	.48½	Stannate, 100 lb drums.... lb.	.41½	.42	.43	.41½
.29	.18	.20	.20	Stearate, bbls............ lb.	.25	29	.29	.25
.18	.16	.16	.16	Sulfanilate, 400 lb bbls..... lb.	.16	.18	.18	.16
.02¾	.02½	.02¼	.02¼	Sulfate Anhyd, 550 lb bbls c-1 wks.............. lb.	.02½	.02¾	.02¾	.02½
.02¾	.02½	.02½	.02½	Sulfide, 30% crystals, 440 lb bbls wks............. lb.	.02½	.02¾	.02¾	.02½
.04	.03½	.03½	03½	62% solid, 650 lb drums 1c-1 wks............ lb	.03½	.04	.04	.03½
.03½	.03¼	.03¼	.03¼	Sulfite, crystals, 400 lb bbls wks................. lb.	.03¼	.03½	.03½	.03¼
.50	.40	.40	.40	Sulfocyanide, bbls......... lb.	.66	.76	.76	.66
.85	.80	.85	.80	Tungsten, tech, crystals, kegs .... lb.	.80	.85	.85	.80
.40	.35	.40	.35	Solvent Naphtha, 110 gal drs wks................. gal.	.35	.40	.40	.35
.01¾	.01¾	.01¾	.01¾	Spruce, 25% liquid, bbls..... lb.	.....	.01¾	.01¾	.01¾
.01	.01	.01	.01	25% liquid, tanks wks..... lb.	.....	.01	.01	.01
.02¼	.02	.02	.02	50% powd, 100 lb bag wks lb.	.02	.02¼	.02¼	.02
4.42	3.07	3.22	3.07	Starch, powd., 140 lb bags .... 100 lb.	3.82	4.02	4.02	3.82
4.32	2.97	3.12	2.97	Pearl, 140 lb bags..... 100 lb.	3.72	3.9?	3.92	3.72
.06¾	.05¾	.06	.04¾	Potato, 200 lb bags........ lb.	.05¾	.06½	.06¾	.05¾
.06¾	.05¾	.06½	.06½	Imported bags.......... lb.	.05¾	.06½	.06¾	.05¾
.08½	.08	.08	.06	Soluble................ lb.	.08	.08½	.08½	08
.10	.09½	.09½	.09	Rice, 200 lb bbls.......... lb.	.09½	.10	.10	.09½
.07	.06½	.06½	.06½	Wheat, thick bags......... lb.	.06½	.07	.07	.06½
.10	.09½	.09½	.09½	Thin bags.............. lb.	.09½	10	.10	.09½
.07½	.07¼	.07¼	.07¼	Strontium carbonate, 600 lb bbls wks.................. lb.	.07½	.07½	.07½	.07¼
.09	.08¾	.08¾	.08	Nitrate, 600 lb bbls NY.... lb.	.09	.09¼	.09¼	.08¾
.....	.....	.....	.....	Peroxide, 100 lb drs....... lb.	.....	1.25	1.25	1.25

Sulfur

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
2.05	2.05	2.05	2.05	Sulfur Brimstone, broken rock, 250 lb bag c-1....... 100 lb.	.....	2.05	2.05	2.05
19.00	18.00	18.00	18.00	Crude, f. o. b. mines...... ton	18.00	19.00	19.00	18.00
2.40	2.40	2.40	2.40	Flour for dusting 99½%, 100 lb bags c-1 NY.... 100 lb.	.....	2.40	2.40	2.40
2.50	2.50	2.50	2.50	Heavy bags c-1...... 100 lb.	.....	2.50	2.50	2.50
3.45	3.45	3.45	3.45	Flowers, 100%, 155 lb bbls c-1 NY............. 100 lb.	.....	3.45	3.45	3.45
2.85	2.65	2.65	2.65	Roll, bbls 1c-1 NY..... 100 lb.	2.65	2.85	2.85	2.65
.05½	05	.05	.05	Sulfur Chloride, red, 700 lb drs wks.................. lb.	.05	.05½	.05½	.05
.04½	03½	.03¼	.03¼	Yellow, 700 lb drs wks..... lb.	.03½	.04½	.04½	.03½
.08½	.08	.08	.08	Sulfur Dioxide, 150 lb cyl.... lb.	.08	.08½	.08½	.08
.19	.17	.17	.17	Extra, dry, 100 lb cyl...... lb.	.17	.19	.19	.17
.65	.10	.65	.65	Sulfuryl Chloride, 600 lb dr... lb.	.10	.65	.65	.10
.11½	.11	.11	.11	Stainless, 600 lb bbls.... lb.	.11	.11½	.11½	.11
.06	.05½	.05	.05	Extract, 450 lb bbls....... lb.	.05½	.06	.06	.05½
130.00	130.00	130.00	130.00	Sicily Leaves, 100 lb bg... ton	.....	130.00	130.00	130.00
72.00	72.00	80.00	72.00	Ground shipment....... ton	.....	72.00	72.00	72.00
60.00	55.00	55.00	55.00	Virginia, 150 lb bags ...... ton	55.00	60.00	60.00	55.00
15.00	12.00	12.00	12.00	Talc, Crude, 100 lb bgs NY... ton	12.00	15.00	15.00	12.00
18.00	16.00	16.00	16.00	Refined, 100 lb bgs NY .. ton	16.00	18.00	18.00	16.00
35.00	30.00	30.00	30.00	French, 220 lb bags NY... ton	20.00	25.00	25.00	20.00
45.00	38.00	38.00	38.00	Refined, white, bags.... ton	38.00	45.00	45.00	38.00
50.00	40.00	40.00	40.00	Italian, 220 lb bags NY... ton	40.00	50.00	50.00	40.00
55.00	50.00	50.00	50.00	Refined, white, bags.... ton	50.00	55.00	55.00	50.00
				Superphosphate, 16% bulk, wks.................... ton	.....	10.00	10.00	9.0C

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Apr. 1929 $1.027

ing in higher prices. Tanks at the Coast are now quoted at 13¼c lb., while barrels New York are at 14¾c @ 15c lb. Total March tung oil exports from Hankow were 7,070,560 pounds, the share of the United States being 6,076,000 pounds, with 994,560 pounds shipped to Europe. It was estimated that the stocks of oil on hand at Hankow the end of March were approximately 5,300 short tons.

Shipments to the United States compared with 2,756,000 pounds in February and 6,662,425 pounds in March a year ago, according to the Department of Commerce. Shipments to Europe during the month compared with 560,000 pounds in February and 1,275,120 pounds in March, 1928. Estimated tung oil stocks at Hankow at the end of March totaled approximately 5,300 short tons, compared with 5,000 tons February 28, and 100 tons March 31, last year.

Coconut Oil — Business generally has been quiet but rather steady during the past month, which conditions have been reflected in prices which are practically unchanged from those prevailing a month ago.

Corn Oil — Following closely on lower prices in the cottonseed oil market, and reflecting also easier conditions in the grain market, corn oil prices have declined about ½c lb. during the past month. Crude oil is now at 8¼c lb. in tanks at the mills and 10½c lb. in barrels, while refined oil is at 10c lb. in tanks and 11¼c lb. in barrels.

Cottonseed Oil — Has taken a decided trend downward during the past month so that crude oil is now at 8⅛c lb., ¾c lb. lower than when last reported. PSY is also lower accordingly at 10c lb. while futures average about 10.15c lb. Cottonseed crushed from Aug. 1 to March 31 totaled 4,595,365 tons, compared with 4,351,494 for the same period in 1928 and cottonseed on hand at the mills on March 31 totaled 386,986, compared with 255,924 a year previous. Cottonseed products manufactured during the period and on hand March 31 included: Crude oil products, 1,443,079,772 pounds, compared with 1,370,359,229 last year and 106,954,831 pounds on hand compared with 124,029,065 a year ago. Refined oil produced totaled 1,227,334,424 pounds compared with 1,116,363,184 and on hand 584,978,238 pounds, compared with 543,876,492. Cake and meal totaled 2,068,926 tons, compared with 1,947,547 and on hand 239,050 tons, compared with 110,600.

Lard Oil — Demand has been rather slack during the past month and as a result prices are down ¼c @ ½c lb. on all grades. Prime is at 15¼c lb., extra at 13¼c lb., and extra No. 1 at 13c lb.

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
5.10&10	4.65&10	4.85	4.00	Tankage Ground NY.......unit	.....	4.50&10	4.75&10	4.50&10
4.80&10	3.90&10	5.25	3.75	High grade f.o.b. Chicago.unit	.....	4.00&1.00	4.80&10	4.00&100
5.00&10	4.60&10	5.25	4.00	South American cif.......unit	.....	4.75&10	4.80&10	4.75&10
.05	.04½	.04½	.04½	Tapioca Flour, high grade bgs.lb.	.04½	.05	.05	.04½
.04	.03¾	.03¾	.03½	Medium grade, bags.....lb.	.03¾	.04	.04	.03¾
.27	.26	.26	.26	Tar Acid Oil, 15%,drums....gal.	.26	.27	.27	.26
.30	.29	.29	.29	25% drums............gal.	.29	.30	.30	.29
.08	.07	.07	.07	Coke Oven, tanks wks.....lb.	.07	.08	.08	.07
13.50	13.50	16.00	13.50	Kiln Burnt, bbl..........bbl.	.....	13.50	13.50	13.50
15.00	13.50	18.50	13.50	Retort, bbls.............bbl.	13.50	15.00	15.00	13.50
1.75	1.15	1.15	1.15	Terra Alba Amer. No. 1, bgs or bbls mills.........100 lb.	1.15	1.75	1.75	1.15
2.00	1.50	1.50	1.50	No. 2 bags or bbls...100 lb.	1.50	2.00	2.00	1.50
.02½	.02	2.00	2.00	Imported bags........100 lb.	.02	.02½	.02½	.02
.....	.....	.....	.....	Tetrachlorethane, 50 gal dr...lb.	.09	.09½	.09½	.09
.20	.20	.20	.20	Tetralene, 50 gal drs wks.....lb.	.....	.20	.20	.20
.24	.22	.22	.22	Thiocarbanilid, 170 lb bbl....lb.	.22	.24	.24	.22
.17½	.14½	.20½	.17½	Tin Bichloride, 50% soln, 100 lb bbls wks................lb.	.....	.14½	.14½	.14½
.41½	.36½	.48	.41½	Crystals, 500 lb bbls wks...lb.	.....	.36½	.36½	.36½
.58	.48	.71½	.58	Metal Straits NY.........lb.	.....	.48	.48	.48
.75	.53	.75	.70	Oxide, 300 lb bbls wks.....lb.	.....	.56	.56	.53
.35½	.30½	.48	.35½	Tetrachloride, 100 lb drs wks. ....lb.	.....	.30½	.30½	.30½
.40	.40	.40	.40	Titanium Oxide300 lb bbl....lb.	.....	.24	.40	.24
.14	.13½	.13½	.13½	Pigment, bbls...........lb.	.09½	.10	.14	.09½
.45	.40	.40	.40	Toluene, 110 gal drs.........lb.	.....	.45	.45	.45
.45	.35	.35	.35	8000 gal tank cars wks.....lb.	.....	.40	.40	.40
.94	.90	.90	.90	Toluidine, 350 lb bbls........lb.	.90	.94	.94	.90
.32	.31	.31	.31	Mixed, 900 lb drs wks.....lb.	.31	.32	.32	.31
.90	.85	.85	.85	Toner Lithol, red, bbls.......lb.	.90	.95	.95	.85
.80	.70	.75	.75	Para, red, bbls............lb.	.75	.80	.80	.70
1.80	1.70	1.75	1.75	Toluidine..................lb.	1.50	1.55	1.55	1.50
3.90	3.60	3.60	3.60	Triacetin, 50 gal drs wks.....lb.	3.60	3.90	3.90	3.60
.....	.....	.....	.....	Trichlorethylene, 50 gal dr...lb.	.10	.10½		
.....	.....	.....	.....	Triethanolamine, 50 gal drs...lb.	.55	.60	.60	.55
.50	.36	.36	.36	Tricresyl Phosphate, drs.....lb.	.33	.45	.45	.33
.73	.69	.70	.69	Triphenylguanidine..........lb.	.58	.60	.70	.58
.75	.70	.70	.70	Phosphate, drums.........lb.	.70	.75	.75	.70
3.00	2.50	2.50	2.50	Tripoli, 500 lb bbls......100 lb.	1.75	2.00	2.00	1.75
.66½	.50½	.86	.53½	Turpentine Spirits, bbls.....gal.	.53½	.59½	.65	.53½
.59	.46	.76	.46	Wood Steam dist. bbls....gal.	.50	.51	.57	.50
.20	.18	.18	.18	Urea, pure, 112 lb cases......lb.	.20	.30	.30	.20
				Fert. grade, bags.........ton	.....	165.00	165.00	165.00
				c. i. f. S. points.........ton	.....	108.15	108.15	108.15
76.00	55.00	70.00	66.00	Valonia Beard, 42%, tannin bags..................ton	.....	50.00	55.00	50.00
55.00	58.00	49.50	39.00	Cups, 30-31% tannin.....ton	.....	35.00	35.00	35.00
64.00	45.00	68.00	43.00	Mixture, bark, bags.......ton	.....	40.00	43.00	40.00
2.10	1.75	1.95	1.55	Vermillion, English, kegs....lb..	2.00	2.05	2.05	2.00
.....	.....	.....	.....	Vinyl Chloride, 16 lb cyl.....lb.	.....	1.00	1.00	1.00
76.00	49.75	59.00	49.50	Wattle Bark, bags..........ton	.....	46.00	49.75	44.50
.06½	.05¾	.05¾	.05¾	Extract 55%, double bags ex-dock.................lb.	.....	.06½	.06½	.06½
1.25	1.25	1.25	1.25	Whiting, 200 lb bags, c-1 wks ....100 lb.	.....	1.25	1.25	1.25
13.00	13.00	13.00	13.00	Alba, bags c-1 NY........ton	.....	13.00	13.00	13.00
1.35	1.35	1.35	1.35	Gilders, bags c-1 NY...100 lb.	.....	1.35	1.35	1.35

Zinc

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.05¾	5.85	.06¼	.06¼	Zinc Ammonium Chloride powd., 400 lb bbls.............lb.	5.25	5.75	5.75	5.25
.10	.09½	.09½	.09½	Carbonate Tech, bbls NY..lb.	.10½	.11	.11	.10½
.06	.06	.06	.06	Chloride Fused, 600 lb drs. wks....................lb.	.05¾	.06	.06	.05¾
.06½	.06¼	.06¼	.06¼	Gran., 500 lb bbls wks.....lb.	.06¼	.06½	.06½	.06¼
3.00	3.00	3.00	3.00	Soln 50%, tanks wks...100 lb.	.....	3.00	3.00	3.00
.41	.40	.40	.40	Cyanide, 100 lb drums.....lb	.40	.41	.41	.40
				Dithiofuroate, 100 lb dr....lb.	.....	1.00	1.00	1.00
.09	.09	.09	.09	Dust, 500 lb bbls c-1 wks...lb.	.08½	08¾	.08¾	.08½
6.40	6.07½	7.35	6.40	Metal, high grade slabs c-1 NY................100 lb.	.....	6 45	6.45	6.45¾
.07¾	.07¾	.07¾	.07¾	Oxide, American bags wks..lb.	.07¾	.07¾	.07¾	.07
.12¾	.10¾	.10¾	.10¾	French, 300 lb bbls wks...lb.	.09¾	.11¾	.11¾	.09¾
.....	.....	.....	.....	Perborate, 100 lb drs.......lb.	.....	1.25	1.25	1.25
.....	.....	.....	.....	Peroxide, 100 lb drs.......lb.	.....	1.25	1.25	1.25
.....	.....	.....	.....	Stearate, 50 lb bbls........lb.	.25	.26	.26	.25
.03¾	.03½	.03½	.03	Sulfate, 400 bbl wks........lb.	.03½	.03¾	.03¾	.03½
.32	.30	.30	.30	Sulfide, 500 lb bbls........lb.	.30	.32	.32	.30
.30	.29	.29	.29	Sulfocarbolate, 100 lb keg..lb.	.29	.30	.30	.29
.32	.32	.38	.32	Xylene, 10 deg tanks wks....lb.	.....	.33	.33	.33
.32	.30	.36	.30	Commercial, tanks wks....lb.	.30	.32	.32	.30
.38	.38	.35	.35	Xylidine, crude..............lb.	.....	.38	.38	.38
.03	.02½	.02½	.02½	Zirconium Oxide, Nat. kegs..lb.	.02½	.03	.03	.02½
.50	.45	.45	.45	Pure kegs.................lb.	.45	.50	.50	.45
.10	.08	.08½	.08	Semi-refined kegs..........lb.	.08	.10	.10	.08

Oils and Fats

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.14½	.13	.14	.13	Castor, No. 1, 400 lb bbls.....lb.	.13	.13½	.13½	.13
.14	.12½	.14	.12½	No. 3, 400 lb bbls.........lb.	.12½	.13	.13	.12½
.17	.14	.18	.17	Blown, 400 lb bbls.........lb.	.14	.15	.15	.14
.17	.14½	.31	.13½	China Wood, bbls spot NY...lb.	.14¾	.15	.15¼	.14½
.14¾	.14¾	.18	.12½	Tanks, spot NY.........lb.	....	Nom.	Nom.	.....
.14¾	.12¾	.....	.....	Coast, tanks, May......lb.	.....	13¼	.14¾	.12½
.11½	.10¾	.12	.12	Cocoanut, edible, bbls NY....lb.	.....	.10¾	.10¾	.10¾
.10	.09¼	.09¾	.09	Ceylon, 375 lb bbls NY....lb.	.09	.09¼	.09½	.09
.09	.08¾	.08¾	.08	8000 gal tanks NY......lb.	.08½	.08¾	.08¾	.08½
.10½	.09½	.10½	.09½	Cochin, 375 lb bbls NY....lb.	.....	.10	.10	.10
.09¾	.08¾	.10	.08½	Tanks NY...............lb.	.09	.09¼	.09¼	.09
.10	.08¾	.09¾	.08½	Manila, bbls NY...........lb.	.09	.09¼	.09½	.09
.08¾	.08	.08¾	.08½	Tanks NY..............lb.	.08½	.08¾	.08¾	.08½
.08½	.07¾	.08¾	.08	Tanks, Pacific Coast.....lb.	.07¾	.07¾	.08	.07¾

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1829 $1.047 - Apr. 1929 $1.027

Linseed Oil — Has declined one cent lb. during the past month so that tanks are now at 9.3c lb., barrels at 10.1c lb., and five-barrel lots at 10.5c lb. Imports of flaxseed have increased rapidly since the beginning of the present crop season, according to the Department of Agriculture. The total for February, amounting to 2,529,000 bushels and the highest monthly total since June, 1927, must be exceeded in the six remaining months of the crop year ending August 31 if the consumption, as indicated by the supply available, is to be maintained at the level of last year. Roughly estimated, the supply for the year ended August 31 was about 44,000,000 bushels. Of this total supply net imports in the form of oil and seed provided an equivalent of approximately 18,000,000 bushels of seed, while the domestic production was 25,847,000 bushels. During the first six months of the present crop year the imports of oil and seed on a seed basis were approximately 9,300,000 bushels; domestic production in 1928 was 19,321,000 bushels, leaving a balance of 15,500,000 bushels still required to bring the available supply up to that of last year. The Tariff Commission has concluded its work in connection with the cost of production investigation covering flaxseed and has submitted its findings to President Hoover.

Palm Oil — Has been in better supply, and as a result prices have declined on both grades. Lagos is now at 8¾c lb., while Niger is at 8¼c lb.

Perilla Oil — An abundance of stocks at the Coast has resulted in greatly reduced prices during the past month. Barrels at New York are now at 16c lb., while Coast tanks are at 13⅛c lb.

Red Oil — Demand continues heavy and prices remain high and unchanged, with tanks at 10¼c lb., and barrels at 11⅛c @ 11⅛c lb.

Soy Bean Oil — Domestic production which has been increasing gradually for almost five years is now in position to command the market, amounting as it does to about ten tank cars per month. Bean production has increased to such an extent, due largely to Government encouragement and subsidy, that the mills believe they will have sufficient stocks to continue in operation right through until the arrival of the next crop. Domestic oil is now said to be equal in every way to the imported material and is quoted at 8½c lb. in tanks, f. o. b. mills, most of which are in the mid-West region. Coast tanks of imported are quoted nominally at 9c lb. but with limited supply, since there is no inducement to bring it in since at that range it cannot compete with the domestic product.

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
				Cod, Newfoundland, 50 gal bbls				
.69	.63	.66	.63	....gal.	.63	.64	.64	.63
.63	.60	.59	.59	Tanks NY....lb.	.....	.60	.60	.60
				Cod Liver see Chemicals........				
.06¼	.05½	.06	.06	Copra, bags....lb.	.....	.485	.05½	.485
.11	.10	.11	.07	Corn, crude, bbls NY....lb.	.....	.10½	.10¾	.10½
.10	.08⅜	.09¾	.07	Tanks, mills....lb.	.....	.08¼	.09⅛	.08¼
.12½	.11¾	.14	.10½	Refined, 375 lb bbls NY....lb.	.....	.11¼	.11¾	.11¼
.11½	.10¾	.12	.11	Tanks....lb.	.....	.10	.11	.10
.09¾	.07¾	.09½	.06½	Cottonseed, crude, mill....lb.	.....	.08⅛	.09	.08⅛
10.65	.09¼	.11½	.08 1/5	PSY 100 lb bbls spot....lb.	.....	.10	.1075	.10
10.75	.09½	.....	.....	June—Aug....lb.	.....	.1015	.1080	.1015
				Degras, American, 50 gal bbls				
.05	.04½	.04½	.04½	NY....lb.	.04½	.05	.05	.04½
.05⅜	.04½	.04⅞	do	English, brown, bbls NY....lb.	.....	.05⅜	.05⅜	.05⅜
.05¾	.05½	.05½	.05½	Light, bbls NY....lb.	.....	.05¾	.05¾	.05¾

Greases

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.08⅛	.07	.07½	.06	Greases, Brown....lb.	.....	.08	.08½	.08
.08½	.07	.08	.06½	Yellow....lb.	.....	.08¼	.08½	.08¼
.11	.09¼	.10⅜	.08¾	White, choice bbls NY....lb.	.....	.08½	.11¼	.08½
.42½	.40	.....	.....	Herring, Coast, Tanks....gal.	.....	Nom.		
Nom.	.09½	.09½	.09	Horse, bbls....lb.	.09½	Nom.	Nom.	.....
.16½	.15½	.16¾	.14¾	Lard Oil, edible, prime....lb.	.....	15¼	.15¾	.15¼
.13½	.12	.13¾	.10¾	Extra, bbls....lb.	.....	.13¼	.13½	.13¼
.13	.11	.12½	.10½	Extra No. 1, bbls....lb.	.....	.13	.13¼	.13
10.8	10.0	.11 4/5	.10 2/5	Linseed, Raw, five bbl lots....lb.	.....	.105	.106	.105
10.4	9.6	.11 9/10	.09 6/10	Bbls c-1 spot....lb.	.....	.101	.102	.101
9.6	8.8	.10½	.09	Tanks....lb.	.....	.093	.094	.093
.09¾	.09¾	.09¾	.09¾	Lumbang, Coast....lb.	.....	.09¾	.09¾	.09¾
.48	.40	.47½	.44	Menhaden Tanks, Baltimore.gal.	.....	.52	.52	.52
.09	.09	.90	.10	Blown, bbls NY....lb.	.....	.09	.09	.09
.70	.67	.70	.67	Extra, bleached, bbls NY..gal.	.....	.70	.70	.70
.64	.63	.66	.63	Ligh, pressed, bbls NY....gal.	.63	.64	.64	.63
.67	.66	.66	.69	Yellow, pressed, bbls NY..gal.	.66	67	.67	.66
				Mineral Oil, white, 50 gal bbls				
.60	.40	.....	.....	....gal.	.40	.60	.60	.40
1.00	.95	.....	.....	Russian, gal....gal.	.95	1.00	1.00	.95
.19	.18¼	.18¾	.14½	Neatsfoot, CT, 20° bbls NY..lb.	.....	.18¾	.19	.18¾
.13½	.12	.13¼	.10¼	Extra, bbls NY....lb.	.....	.13½	.13½	.13¼
.16¼	.15½	.16¾	.12½	Pure, bbls NY....lb.	.....	.15	.15½	.15
.17⅜	.11¾	.18½	.10	Oleo, No. 1, bbls NY....lb.	.....	.11½	.11½	.11½
.15½	.11	.17	.08¾	No. 2, bbls NY....lb.	.....	.11	.11¼	.11
.14	.10	.14	.08½	No. 3, bbls NY....lb.	.....	.10½	.10½	.10¼
1.40	1.18	1.75	1.40	Olive, denatured, bbls NY...gal.	1.25	1.30	1.30	1.25
2.00	1.75	2.00	2.45	Edible, bbls NY....gal.	1.95	2.00	2.00	1.95
.11	.09⅜	.10¼	.08¾	Foots, bbls NY....lb.	.10⅛	.10¼	.11½	.10⅛
.09½	.08½	.09½	.09	Palm, Kernel, Casks....lb.	.....	.09	.09	.08
.09¼	.07¾	.08¾	.07½	Lagos, 1500 lb casks....lb.	.....	.08¾	.09	.08¾
.08⅜	.07	.08½	.07½	Niger, Casks....lb.	.....	.08¼	.08¾	.08¼
.12½	.12	.14½	.12	Peanut, crude, bbls NY....lb.	.....	Nom.	Nom.	.....
.17	.14½	.15½	.14½	Refined, bbls NY....lb.	.14½	15	.15	.14½
.21	.13	.16½	.12½	Perilla, bbls NY....lb.	.....	.16	.20	.16
.15½	.10¼	.14½	.10	Tanks, Coast....lb.	.....	.13⅛	.14½	.13⅜
1.75	1.70	1.70	1.70	Poppyseed, bbls NY....gal.	1.70	1.75	1.75	1.70
1.06	1.01	1.05	1.00	Rapeseed, blown, bbls NY...gal.	1.04	1.04	1.04	1.04
.92	.83	.90	.82	English, drms. NY....gal.	.88	.90	.90	.85
.90	.81	.85	.76	Japanese, drms. NY....gal.	.86	.88	.88	.84
.10⅜	.09½	.10	.09	Red, Distilled, bbls....lb.	.11⅛	.11⅜	.11⅜	.10⅜
.09¾	.08	.09½	.08½	Tanks....lb.	.....	.10¼	.10¼	.09¾
.5-	.42	.50	.50	Salmon, Coast, 8000 gal tks..gal.	.42	.44	.44	.42
.50	.41	.47	.43	Sardine, Pacific Coast tks...gal.	.....	.45	.51	.45
.13½	.12	.13	.11½	Sesame, edible, yellow, dos...lb.	.11½	.12	.12	.11½
.15	.12½	.14	.14	White, dos....lb.	.12¼	.12½	.12½	.12¼
.40	.40¾	.40	.40	Sod, bbls NY....gal..	.....	.40	.40	.40
.....	.....	.09⅜	.09½	Soy Bean, crude....				
.09¾	.09	.....	.....	Pacific Coast, tanks....lb.	.....	.09	.10	.09
				Domestic tanks, f.o.b. mills, ...lb.	.....	.08½	.08½	.08½
.12½	.12	.12¼	.10¾	Crude, bbls NY....lb.	.....	.12	.12¼	.12
.10⅜	.10¼	.11	.10¼	Tanks NY....lb.	.....	Nom.	.10¾	.10¼
.13¾	.13¾	.13	.12	Refined, bbls NY....lb.	.13¼	.13½	.13½	.13¼
				Sperm, 38° CT, bleached, bbls				
.85	.84	.85	.84	NY....gal.	.84	.85	.85	.84
.80	.79	.82	.79	45° CT, bleached, bbls NY gal.	.79	.80	.80	.79
				Stearic Acid, double pressed dist				
.18½	.11	.13¼	.11½	bags....lb.	.16	.16½	.18½	.16
				Double pressed saponified bags				
.19	.11½	.14	.11½	....lb.	.16½	.17	.19	.16½
.20½	.13½	.15½	.13½	Triple, pressed dist bags..lb	.18½	.19	20½	.18½
.12½	.09½	.13	.08¾	Stearine, Oleo, bbls....lb.	.11¾	.12	.12	.11¾
.09½	.08½	.09	.07½	Tallow City, extra loose....lb.	.08⅜	.08¾	.08⅝	.08¾
.10¾	.09¾	.11	.08½	Edible, tierces....lb.	.09½	.09¾	.10½	.09½
.12¼	.11¼	.10¾	.08½	Tallow Oil, Bbls, c-1 NY...lb.	.....	.11¼	.12	.11¼
.11½	.10½	.12¼	.10	Acidless tanks NY....lb.	.....	.10¼	.11	.10¼
Nom.	.08	.08⅜	.07½	Vegetable, Coast mats....lb.	.08	Nom.	Nom.	.08
.11	.....	.11	.11	Turkey Red, single bbls....lb.	.11	.12	.12	.11
.16	.14	.14	.14	Double, bbls....lb.	.14	.16	.16	.14
				Whale, bleached winter, bbls				
.80	.78	.78	.78	NY....gal.	.78	.80	.80	.78
.82	.80	.80	.80	Extra, bleached, bbls NY..gal.	.80	.82	.82	.80
78	.76	.76	76	Nat. winter, bbls NY....gal.	.76	.78	.78	.76

Local Reports *from our Correspondents at the Principal Consuming Centers of Industrial Chemicals*

CHICAGO

Business has been fair during the past month, although generally speaking pretty spotty most of the time. The most active items have been the heavy chemicals, particularly stearic acid, red oil, formaldehyde, wood alcohol and naphthalene. Collections have been good.

KANSAS CITY

Conditions in the Kansas City territory remain about as usual with a slight let-up in movements. The crop conditions are making favorable progress, but some damage has been done by excess of water and rain in certain localities, but as a rule there is considerable optimism throughout the agricultural territory. There is no unusual commodity conditions except the prices on Blue Vitriol are easing off somewhat. A good deal of interest is being displayed in ALCOHOL for next season and purchasers are anxiously awaiting opening prices. Collections are not quite as prompt as they should be and the evil of discounting bills after they are past due—specially on institute items is getting to be a common practice.

PHILADELPHIA

There have been excellent calls for seasonal chemical items. This is especially true of Naphthalene, Calcium Chloride, Copper Sulfate, Lead Arsenate, Sulfur, etc. Contract withdrawals of Alkalis have been especially good and spot store stocks are turning over at a satisfactory rate. On the other hand the fluctuations in Copper have been disconcerting to those interested in Bluestone and Copper Carbonate, etc. Competition is especially keen in Acetic Acid, Glauber Salts, Sodium Sulfide and some other of the textile trade items. Collections are fair to slow.

LOS ANGELES

Business conditions remain very good in Los Angeles. Slight decline in copper sulphate. Collections improving. No other changes.

Local Reports *from our Correspondents at the Principal Consuming Centers of Industrial Chemicals*

Missouri---(cont.)

New Jersey

New York

CLEVELAND

The paint, varnish, lacquer and chemica industries are going along 100% per cent. at the present time and business on those particular lines is excellent. The dullness which existed shortly after the holidays for a period of six or eight weeks has vanished and all the manufacturers are now reporting excellent business. The steel manufacturers are running 100 per cent. as well as the automobile and auto accessory companies. The feeling exists among individual leaders in this locality that business will keep up until late in the fall. Beyond that they will not predict. There has been very little buying of china wood oil and linseed oil. Rosin and turpentine have been going along steadily, but no particular action in those lines. Prices on denatured alcohol for the fall anti-freeze business will, undoubtedly, be published shortly and we believe there will be no hesitancy on the part of buyers to place their commitments.

NEWARK

Conditions in northern New Jersey during the last few weeks have been, on the whole, very satisfactory. Heavy chemicals are moving in substantial volume; prices seem firm and there has been little or no change in basic products with the exception of Blue Vitriol which, in sympathy with copper, has gone off slightly. There seems to be some complaint about slowness in collections but employment is good and the plants are operating very little below normal capacity. The leather industry is weak. It is rumored that one or two other concerns of long standing in the trade are about to liquidate and retire. This has been the trend in this territory over the last five years so that what was once the heaviest leather district in the country has passed out and only a few of the old line houses remain. Artificial leathers, however, are in great demand and the plants producing these are operating extensively. Everyone seems to think that the coming month will retain the advantage that has been secured during the past few weeks and by comparison with the Spring of 1928 almost all factors are in favor of 1929.

Ohio

Pennsylvania

Rhode Island

Index To Advertisers

"WE"—Editorially Speaking

Personally, we are inclined to regret somewhat, the fact that Mr. Case of the General Motors Research Corp., did not let his genie uncork himself in a really big way, in the transformation of that automobile into the original materials which entered into its manufacture. Then indeed we should have had a picture worthy of Dante in his best moments. For with iron, carbon, manganese, phosphorus, sulfur, silicon, sulfuric acid, lime and other assorted chemicals entering into the fabrication of the steel in the chassis; fenders and radiator shells produced through the use of all those materials and more, including soda ash, soda caustic, copper cyanide, nickel sulfate and chromic acid; and with other chemical compounds, such as coke, charcoal, barium carbonate, calcium carbonate and sodium carbonate, necessary to the fabrication of camshafts, connecting rods and transmission gears; we should have had quite a collection.

The aforementioned genie might make of the rubber tires some crude rubber and a quite representative list of chemical compounds, including barium sulfate, carbon black, iron oxide, lead sulfate, zinc oxide and a few accelerators—organic substances with such unassuming names as diphenylguanidine and diorthotolyguanidine. While into the production of dazzling two-color "paint jobs" go such substances as cotton, sodium hydroxide, chlorine, nitric acid, sulfuric acid, alcohol, ethyl acetate, ethyl lactate, butyl acetate and other chemicals, along with the prussian blue, chrome green, or other pigment which gave the color itself.

However, with an eye to strict scientific accuracy, Mr. Case tempered justice with mercy, so to speak, and presented us with a very fine analysis of the car in terms of chemicals. We believe that visualizations of this sort have unusual interest, and we may whisper in advance that Dr. Esselen is doing a story for us, which we think we shall call "The Chemical Lady," which should bring a little "sex appeal" into an industry unusually devoid of this commodity.

Dr. Redman has reviewed for us the outstanding achievements within the phenol resinoid industry during the past decade. New fields of application have opened constantly with lower prices and improvements in the molding art, so that it comes with but little of a shock to discover that tenfold progress has been made within the past ten years. His concluding statement to the effect that the next ten years are likely to show even more rapid progress, coming as it does from the one person best qualified to speak about the phenolic resins, offers considerable food for thought.

COMING FEATURES

RETROSPECT AND PROSPECT IN THE NITROGEN INDUSTRY

The author of "Chemical Engineering Economics," Chaplin Tyler of Lazote, Inc., brings the story of nitrogen up to date and points out the tendencies of future developments.

ANILINE OIL

Dr. P. H. Groggins discusses process and production developments which combined to bring about low prevailing prices in this material.

MARKETING RAW MATERIALS

Professor James L. Palmer discusses the problems which are peculiar to the selling of raw materials and with which such a large portion of the chemical industry is concerned.

NOW IT CAN BE TOLD

In which another chapter will be added to the history of early days in the American chemical industry.

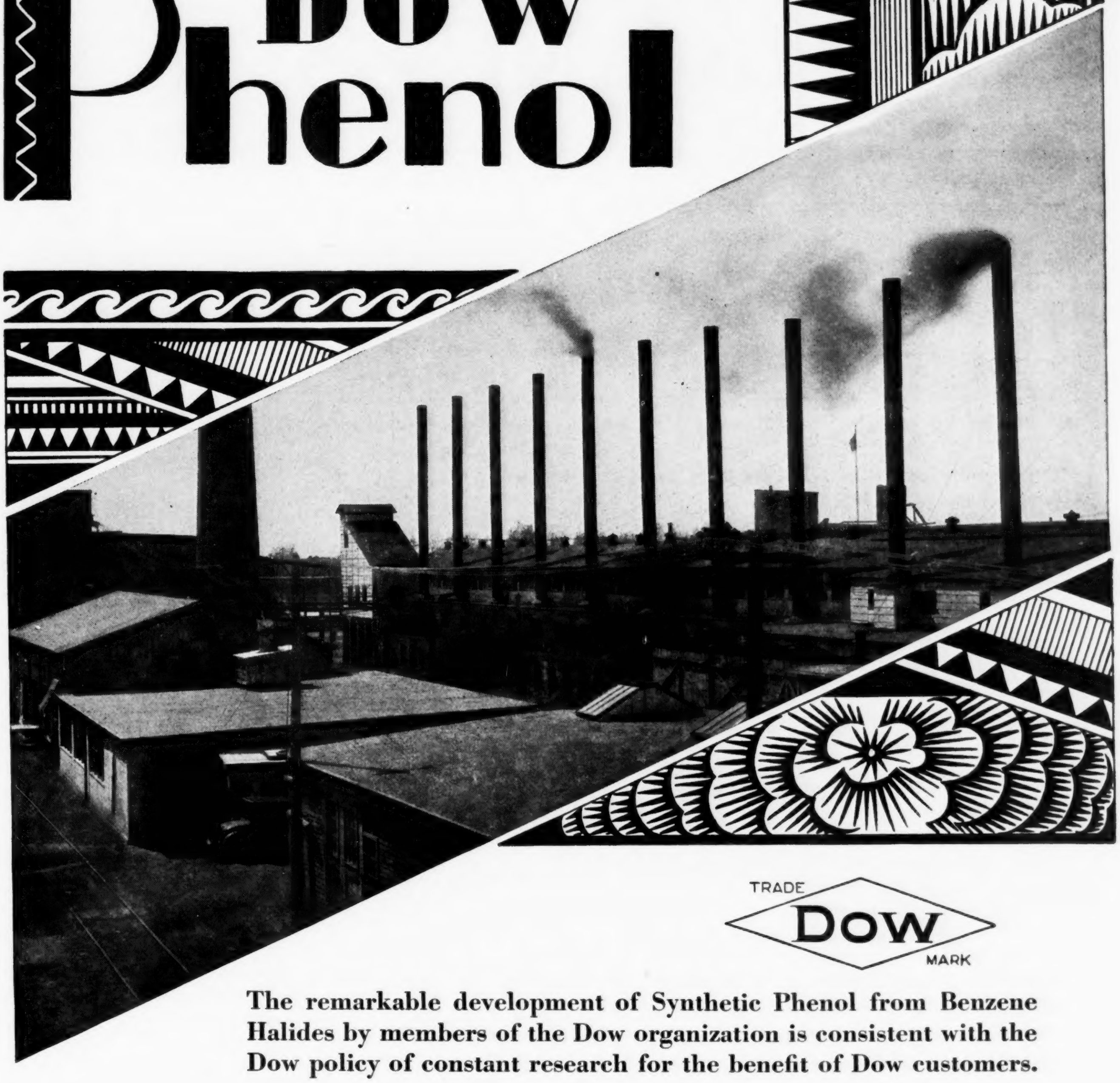
In the midst of all the talk concerning alcohol and a tariff on molasses in the interests of "farm relief," it comes as relief of a different sort to examine the facts concerning alcohol production as presented by Dr. Backhaus. Given the facts on raw materials, production and prices, those who now speak so glibly concerning a complete change in raw material might think twice before indulging in further chemico-agricultural economics of this type.

While on the subject of farm relief, we are reminded of the fact that the disposal of Muscle Shoals is still, or again, under discussion. It is truly "a consummation devoutly to be wished" that this perennial problem be settled. In "Nitrogen and the Fertilizer Industry" Mr. Charles Brand, gives a clear analysis of the entire situation accompanied by the official platform of the National Fertilizer Association on the issues involved.

Seldom have we seen a more complete and interesting treatment of various types of chemical plant equipment than is contained in the article by Mr. Place an English chemical engineer; while Mr. MacKelcan gives us a complete picture of the troublesome problems which have accompanied the selling of chemicals through the "tare" factor in chemical shipments.

One reaction from the announcement of the American I. G. seems amusing enough to make it worth-while passing on. It came from the sales manager of one of the largest chemical organizations and we shall quote it without comment. He said, "Judging by some of the talk, one would suppose that the I. G. could put a Frigidaire into the National City Bank and turn out formaldehyde in carload quantities."

DOW Phenol



TRADE **DOW** MARK

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